

1. DEPARTMENT OF AGRICULTURE (USDA)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Agriculture reported a decrease in energy consumption in buildings of 22.5 percent in Btu per gross square foot compared to FY 1985.

USDA Performance Toward Buildings Energy Reduction Goals



USDA Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	1,033.4	19,740.1
Fuel Oil	12.4	89.6
Natural Gas	573.3	1,994.7
LPG/Propane	101.7	637.2
Coal	0.6	3.0
Purchased Steam	112.0	1,126.0
Other	68.4	1,562.0
Total	1,901.8	25,152.6

The signing of Executive Order 13123 prompted USDA to initiate a reassessment of energy management program activities; specifically those related to energy data collection and analysis, examination of its building inventory, determining building status under various goals, and performing outreach assistance to USDA agencies.

USDA's major facility-owning and leasing agencies have made substantial progress since 1995 in funding energy conservation projects, incorporating energy factors into Solicitations for Offers, designating energy showcase facilities, and utilizing active and passive solar power systems. Based on the prioritization surveys and SAVEnergy audits of previous years, numerous retrofit and new consumption projects have been undertaken across the country.

DOE's Federal Energy Management Program, through its SAVEnergy program, has completed comprehensive energy audits on 305 Forest Service (FS) buildings for a total of 1.4 million square feet.

An in-house survey of the energy consumption at ARS facilities identified those research locations with a high Btu per gross square foot energy utilization. Based on this survey, ARS developed a national priority list for conducting comprehensive facility audits. The order of audit priorities was assigned considering such factors as current level of energy utilization per gross square foot, research program priority, and past and future planned renovation/modernization actions.

Energy conservation activities identified in a previously completed audit for the National Animal Disease Center (NADC) facility in Ames, Iowa, have been incorporated in planning for an ESPC contract anticipated for NADC.

The Animal Plant and Health Inspection Service's (APHIS) Hawaii Fruit Fly Rearing Facility in Waimanalo, Hawaii replaced ten eight-year old corroded air handling units with new efficient motors. The new system is designed to permit 36 percent less outdoor air intake.

During FY 1999, ARS conducted energy efficiency improvement projects at more than 30 facilities across the country. Energy conservation measures implemented include roof replacements, upgrading HVAC and lighting systems, building envelope improvements, boiler replacements, and office equipment upgrades. Other energy and water projects implemented during FY 1999 at ARS's Midwest and North Atlantic Area include:

- Recirculating water bath with annual savings of 315,000 gallons.
- New water tower for heat pumps at a cost of \$204,000 and an annual savings of \$12,000 and 10 million cubic feet of water.
- HVAC steam coil preheat project completed at a cost of \$64,000 for an annual savings of 24.4 billion Btu at National Soil Tilth Lab.
- Replacement of archaic windows at the main building of Ft. Detrick, Maryland with energy efficient insulated glass windows at a cost of \$75,000.

- A building automated control system is being upgraded in Boston, Massachusetts. Phase 1 was implemented during FY 1999 at a cost of \$247,000.
- Growth chamber controls and lighting systems have been upgraded at a facility in Beaver, West Virginia for maximum efficiency at a cost of \$155,000. Also, greenhouse control systems have been converted and upgraded with computer based control systems at a cost of \$69,000.
- Installation of variable frequency drives, hot water line sensors, and pressure sensors on fume hood ducts at a Riverside, California facility.
- Several fume hoods at the ARS's Wapato, Washington facility were placed on a night shutdown schedule, cutting the facility's heating fuel usage by almost 50 percent, and producing estimated savings of \$50,000 annually.

Water conservation efforts implemented during FY 1999 included ARS's Wapato, Washington facility totally eliminating waste water from its evaporators with a newly designed recirculating closed water cooling system. Water usage was cut by an estimated 240,000 gallons annually.

ARS's National Center for Agricultural Utilization Research (NCAUR) in Peoria, Illinois also installed several water conservation projects during FY 1999. They include:

- A cooling water loop replacing single pass water used for heat pumps and air conditioning units with recycled water. Annual savings are estimated at \$13,766 and more than 1 million cubic feet of water.
- A condensate control project with annual savings of \$3,679 and more than 10,000 therms.

In FY 1999, ARS activities to reduce the use of petroleum in buildings and facilities included the following:

- Dual fuel burners (oil and gas) for spot gas market availability are utilized at the Eastern Regional Research Center in Wyndmoor, Pennsylvania and the Appalachian Soil and Water Conservation Research Laboratory in Beaver, West Virginia.
- A natural gas emergency generator in lieu of a diesel generator has been installed for the new

25,000-square-foot laboratory/office building nearing completion in Weslaco, TX.

Solar and Other Renewable Energy

DOE's Federal Energy Management Program funded the following two projects during FY 1998 and FY 1999 at the FS's Fishlake National Forest in Utah:

- A trailer-mounted photovoltaic system for the Big Flat Guard Station. Funds provided totaled \$48,700. Project payback period is 9.3 years.
- Portable photovoltaic generators for use in fighting fires. Estimated payback is 8.8 years.

The Forest Service's Missoula Technology and Development Center received, in FY 1999, a \$44,000 grant from the Department of Energy to install photovoltaic lighting systems at fire camps. Other FY 1999 Forest Service renewable projects include the installation of:

- Ground-source heat pumps during the construction of the Choctaw Ranger District Office in Oklahoma and the Middle Fork Office in the Willamette National Forest.
- Photovoltaic-powered pumps at the Baseline-Horesprings Allotments Range/Wildlife Watering Project in Apache-Sitgreaves National Forest and the Douglas Ranger District in Coronado National Forest.
- Photovoltaic lighting and fan systems at three toilet buildings and a photovoltaic powered pump at the Red Canyon Camp Ground in the Cibola National Forest.
- Photovoltaic systems to power a pump and alarm system for a wastewater holding tank at the Alto Pit in the Prescott National Forest.
- Three communication repeaters powered by photovoltaic batteries in the Coronado National Forest.

During FY 1999, ARS's Horticultural Research Laboratory in Fort Pierce, Florida, implemented passive solar strategies including daylighting, shading, and glazing.

Showcase Facilities

ARS has named the Horticultural Research Laboratory in Fort Pierce, Florida, and the San Joaquin Valley Agricultural Center in Parlier, California as new

building showcases. These buildings incorporated advanced technologies and practices for energy efficiency and conservation.

Personnel Development

ARS, the Office of Operations and the Forest Service report that energy conservation will be incorporated as an element, as appropriate, in position descriptions and performance standards of engineers, facility managers and other personnel considered to be critical for the implementation, coordination, and monitoring of USDA's energy management program.

In FY 1999, ARS engineers and other employees participated in energy management training or attended energy conferences offered by the Federal government or private sector. The Forest Service often includes energy management issues and short training sessions during the Forest Service National Facilities Workshops and regional meetings.

Three Office of Operations engineers are Certified Energy Managers.

Funding

During FY 1999, the Office of Operations (OO) reported the funding of energy conservation improvements by the Washington Area Service Center (WASC) amounting to \$100,000. Most of this funding was expended in the modernization of an energy and water efficient showcase facility in the South Building Phase I, and the design of a new showcase in South Building Phase II.

Also during FY 1999, ARS accomplished more than \$2.2 million worth of building energy efficiency projects in more than 30 facilities across the country.

Energy Savings Performance Contracts (ESPC)

ARS will award a delivery order under the Department of Energy's Mid-Atlantic Regional Super ESPC in February 2000. The project at the National Agricultural Library in Beltsville, Maryland will include lighting retrofits, burner replacements, chiller system updates, and a building automation system. Estimated cost savings over the 18-year contract are \$1.8 million.

ARS will also award a delivery order under the Midwest Regional Super ESPC in January 2000 at the National Animal Disease Center in Ames, Iowa. The project will include lighting, HVAC, and chiller system retrofits and replacements, and installing cogenerators. Savings are estimated at \$13.1 million over the 17-year contract.

The Forest Service signed an ESPC delivery order with Honeywell, Inc., in September 1998 for the Corvallis, Oregon Laboratory. The installation phase began in February 1999. Energy conservation measures installed will include lighting retrofits, steam system modifications, and premium efficiency motors. The project will produce annual savings of \$84,500 over the 10-year term.

The Forest Service is evaluating several ESPC opportunities for FY 2000:

- The Rocky Mountain Research Station is proposing to use an ESPC at the Southwest Forest Science Complex in Flagstaff, Arizona.
- The Northeastern Forest Experiment Station/Northeastern Area are evaluating possible ESPCs at the Ohio, Durham Eastern, and West Virginia Forestry Sciences Laboratories.

Procurement of Energy Efficient Products

USDA relies on government-wide procurement policies for purchase of life-cycle cost-effective goods and products, as promulgated by GSA and DOD supply schedules, DOE guidelines, and the FAR.

One particular area in which USDA has made significant progress is the procurement of environmentally sound energy-efficient products and those products that contain a high percentage of recovered materials. USDA agencies purchase energy-efficient products whenever practicable and whenever they meet the Agency's specific performance requirements and are cost-effective.

ARS purchases all its energy-efficient products through the Departments Customer Supply Centers, and through GSA. In accordance with Executive Order 12845, ARS acquired microcomputers which met the Environmental Protection Agency ENERGY STAR® requirements for Energy Efficiency Products.

Energy Management Contact

Ms. Sonia Torres
Office of Procurement, Property Management,
and Emergency Preparedness
U.S. Department of Agriculture
Mail Stop 7304
Washington, DC 20250-9304
Phone: 202-720-3673
Fax: 202-720-3747

2. DEPARTMENT OF COMMERCE (DOC)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Commerce reported a decrease in buildings energy consumption of 33.2 percent in Btu per gross square foot compared to FY 1985.

DOC Performance Toward Buildings Energy Reduction Goals



DOC Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	324.1	6,949.0
Fuel Oil	5.3	22.6
Natural Gas	75.2	295.5
Propane	0.8	5.3
Purchased Steam	44.1	659.4
Total	449.5	7,932.8

Commerce Department bureaus with responsibility for energy and water management in Federal facilities are:

- DOC, Headquarters, Herbert C. Hoover Building (HCHB);
- National Oceanic and Atmospheric Administration (NOAA);
- National Institute of Standards and Technology (NIST);
- Patent and Trademark Office; and
- Bureau of Census.

Commerce is continuing to benefit from the SAVEnergy audits offered by the Department of Energy's Federal Energy Management Program. In FY 1999, Commerce completed five audits and plans to complete approximately six more in FY 2000. These include audits of weather service stations, laboratories, and office buildings.

NIST requested SAVEnergy audits for Buildings 1, 24, and 2 on the Boulder campus and Building 101 on the Gaithersburg campus.

Commerce is participating on the Task Force Working Group developing Federal guidelines for sustainable development and is preparing a far-reaching sustainable design policy statement to incorporate into its standard practices. NOAA is already incorporating this criteria into designs for the new laboratory in Santa Cruz eliminating the traditional mechanical ventilation systems and, utilizing natural ventilation instead.

NIST facilities are defined as energy intensive due to the nature of the laboratory operations and required environmental conditions. NIST is thereby exempt from some energy reduction requirements of the National Energy Conservation Policy Act (NECPA) Section 543 and Executive Order 12902. However, NIST is working to meet these goals to the extent possible without affecting mission critical operational needs. NIST is planning to reduce energy consumption at facilities in the following ways:

The site-wide energy conservation master plan for NIST's Gaithersburg Campus is used for planning energy conservation projects. Architectural/engineering design of energy conservation measures for building modifications to conserve energy and water is underway. The design contract includes HVAC enthalpy-based economizer and HVAC setback controls. Design of energy conservation measures in one laboratory building will retrofit variable air volume measures and control adjustments to air handling units that are planned for FY 2000 construction. Calculated savings projected for FY 2001 are \$342,000 for gas and electricity.

Improvements at the NIST steam and chilled water generation plant continued during FY 1999. The two new boilers at the central steam plant are operating. New boiler submittal information shows operating efficiencies from 82 to 85 percent, whilst the older boilers were performing at efficiencies of less than 80 percent. The improved steam plant efficiency will provide savings in future years. Upgrading the older four existing boilers has similarly improved their performance and reduced emissions.

NIST's Technical Services Division, Boulder, Colorado completed a study to evaluate the potential energy savings of a central utility plant instead of existing satellite heating and cooling facilities. The study

revealed that a central plant will be more efficient than older individual equipment. They also continue the upgrading of buildings by adding additional R-22 insulation to exterior walls during remodeling. Conversion to energy efficient lighting continues through the use of efficient ballasts and lower energy use bulbs during maintenance.

A contract design for installation of water flow restrictors, low flow toilets and urinals within six Gaithersburg site buildings is now complete.

Solar and Other Renewable Energy

Solar film installation has been completed on the NIST Administration Building with estimated savings of \$6,000 per year.

NOAA's Western Administrative Support Center installed photovoltaic security lights and solar water heaters. More photovoltaics are planned.

Showcase Facilities

Commerce designated HCHB an energy showcase and has identified eight major projects at an estimated cost of \$3 million and savings of \$745,000 annually.

The Kihei Whale Sanctuary in Kihei Maui, Hawaii, is also designated an energy showcase.

Personnel Development

Commerce cosponsored the World Energy and Environmental Congress and Environmental Technology Conference (WEEC/ETE) hosted by the Association of Energy Engineers in Atlanta, GA. In addition, WEEC/ETE was selected by Commerce as an official Foreign Buyer Program in support of the export potential of the industry it serves.

Energy Savings Performance Contracts

NOAA is working with the Department of Energy using the Super Energy Saving Performance Contract (ESPC) program to implement energy cost savings projects. The proposed projects include:

- Upgrade existing HVAC units;
- Replace existing HVAC units;
- Replace and/or retro fit fluorescent lighting fixtures.

Utility Partnerships

Commerce is working with GSA and DOE to implement some of the HCHB projects through an energy service agreement with the local utility company, PEPCO. Using this method, improvements will be completed at no initial cost to the government.

The Kihei Whale Sanctuary photovoltaic project is being cofunded by DOE's National Renewable Energy Laboratory and the Maui Electric Company.

Energy Management Contact

Mr. James Woods

Energy Conservation Officer

Office of Federal Property Programs

U.S. Department of Commerce

Herbert C. Hoover Building, Room 1329

14th and Constitution Avenue, NW

Washington, DC 20230

Phone: 202-482-0885

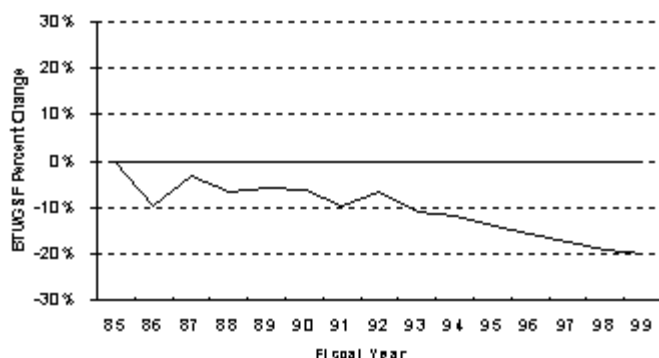
Fax: 202-482-1969

3. DEPARTMENT OF DEFENSE (DOD)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Defense reported a decrease in energy consumption in buildings of 19.8 percent in Btu per gross square foot compared to FY 1985.

DOD Performance Toward Buildings Energy Reduction Goals



DOD Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	85,404.3	1,384,470.2
Fuel Oil	28,980.7	148,999.5
Natural Gas	75,758.6	285,607.8
Propane	1,525.9	14,309.9
Coal	14,982.6	32,712.2
Purchased Steam	10,654.8	159,510.0
Other	651.1	765.2
Total	217,958.2	2,026,374.8

The Department's excluded buildings and industrial process facilities (i.e. buildings with energy intensive operations) consumed 171,348 BTU/square foot in FY 1999. DOD cannot measure specific progress towards meeting the Executive Order 13123 goal for these facilities (25 percent energy reduction between FY 1990 and FY 2010), because many Defense Components lack adequate square footagerecords prior to FY 1996 and no other practical metric has been found. However, on a BTU/Square foot basis, the energy consumed in these facilities has come down 3.9 percent since FY 1996—an average of 1.3 percent per year—a rate greater than the 1.25 percent annual reduction called for by Executive Order 13123.

The Principal Deputy Under Secretary of Defense (Acquisition, Technology and Logistics) is the DOD Senior Agency Official responsible for meeting the goals of Executive Order 13123. The existing DOD Installations Policy Board (IPB), chaired by the Deputy Under Secretary of Defense (Installations) and chartered to address a broad spectrum of installations issues, has been designated as the DOD Agency Energy Team. The membership of the IPB contains the cross-section of DOD senior leadership necessary to make decisions needed to remove obstacles hindering compliance with the Executive Order

All 61 U.S. Navy FY 1999 Military Construction (MILCON) projects incorporated sustainable design criteria. The Navy participated in the National Town Meeting for a Sustainable America in May 1999. Their booth highlighted the Whole Building Design Guide and the bachelor enlisted quarters (BEQ) at Great Lakes, Illinois. The BEQ was accepted by the U.S. Green Building Council as one of their 25 pilot projects being used to test their Leadership in Energy and Environmental Design criteria. The new BEQ at Naval Station Pearl Harbor, Hawaii, incorporating several sustainable design features, was awarded the First Annual Good Business Energy Efficiency Award by the Hawaiian Electric Company in February 1999.

The Air Force has employed sustainability concepts during the planning, design, construction, operation, and demolition of Air Force facilities. This also supports many aspects of DOD's compliance assurance and pollution prevention program requirements. Projects designed or built this fiscal year using sustainable design principles include: 108 units of replacement housing at Vandenberg AFB, California; FY 2000 Fitness Center at Barksdale AFB, LA; and a multimillion-dollar MILCON C-17 beddown at McChord AFB, Washington.

The U.S. Army Corps of Engineers has the responsibility to develop and adopt sustainable design for Army installations. The installations are encouraged to approach land use planning and urban design in a more holistic manner and integrate sustainable development into the master planning process. The Army Planning for Community Energy, Economic, and Environmental Sustainability program (PLACE³S), which creates a coordinated, information-based planning process, is facilitated by "Smart Places," a public domain software.

Other DOD agencies emphasize energy efficiency in new facility construction and rental procurement. Agencies that do not use the Army Corps of Engineers or Naval

Facilities Engineering Command issue their own energy policy. The Defense Commissary Agency (DeCA) has published a design criteria handbook, which emphasizes sustainable design, life cycle costing, and pollution prevention. The Fort McPherson, Georgia, Commissary, built in 1999, incorporates dual path air conditioning, occupancy sensors, refrigeration monitoring control system, and state of the art lighting systems.

The new remote delivery facility project, being built directly adjacent to the Pentagon for Washington Headquarters Service, will incorporate sustainable design principles to minimize the impact that the facility has on the environment. These design elements include minimizing the building profile, low maintenance, native landscaping, energy efficient mechanical and electrical systems, indoor air quality monitoring and ventilation control, and the use of environmentally preferred products.

NIMA completed a construction of a replacement facility in Arnold, Missouri for those lost during the St. Louis floods in 1993. The new facility, a \$40 million complex to house printing, distribution, and storage functions, has been designed to conform with DOD energy efficiency requirements. In FY 1999, the National Security Agency has obtained a new and more efficient leased office building at their annex complex. The main strategy was to ensure that new buildings and renovations are being designed with "energy smart" features and endorsing the Agency's procurement of more energy efficient equipment.

The Defense Finance and Accounting Service (DFAS) and other DOD components using GSA leased facilities incorporate sustainable technologies when renovating existing facilities or when new buildings are designed. In close coordination with GSA and using an Army Corps of Engineers design, a complete renovation was made to the DFAS Indianapolis Center. The project included improvements to the building envelope and replacement of the heating, ventilation, and air conditioning (HVAC) system. In addition, four other MILCON program improvement projects were completed in FY 1999 for DFAS facilities at Rock Island, Illinois, Columbus and Dayton, Ohio, and DFAS Headquarters in Arlington, Virginia. These projects featured energy efficiency measures such as energy monitoring systems, motion sensors, state of the art controls, efficient HVAC systems, double pane windows, and building insulation.

DOD fuel oil consumption in buildings decreased by 5.8 percent from FY 1998 to FY 1999. Each component's energy management plan includes a

strategy to reduce the use of petroleum and to replace the fuel oil-fired boilers with natural gas or dual-fuel burners. The Army encourages maximum efforts be taken to improve plant efficiency and implement usage of non-petroleum fuels. The Air Force has a program to convert from petroleum to other energy sources where cost effective and logical, achieving a 66.9 percent decrease since FY 1985.

The Navy aggressively pursues the elimination of fuel oil for heating buildings where natural gas is available and conversion costs can be recovered within 10 years resulting in petroleum use decreasing by 16 percent from FY 1998 to FY 1999. Distributed heating projects are currently underway at Naval Air Engineering Station Lakehurst, New Jersey; Naval Technical Training Center Pensacola, Florida, and Naval Air Station Fallon, Nevada. The Navy also uses an optimization program for its central plants, which includes reviewing boiler loading and redundancies, and operator training. In FY 1999, projects identified include fuel switching, remote monitoring and control, and re-building equipment.

DESC is the implementing agency for the DOD Direct Supply Natural Gas Program. The objective of this program is to obtain the most cost-effective and reliable supply of natural gas for DOD installations, encouraging the Components to minimize their use and reliance on petroleum products. In FY 1999, DESC competitively procured over 46 trillion Btu of natural gas, with 166 DOD installations participating in the program, saving more than \$29 million (five more installations and \$5.5 million greater savings than FY 1998). Fuel oil as backup to interruptible natural gas reduced by 18,375 gallons (2.5 billion Btu) from FY 1998 to FY 1999. Direct conversion from fuel oil to natural gas eliminated more than 55,000 gallons of fuel oil in FY 1999 (annual thermal content of 7.6 billion Btu).

Solar and Other Renewable Energy

In early 1998, the Department committed itself to the Million Solar Roofs Initiative, with a Departmental goal of 3,000 solar roofs in use by the end of FY 2000. The Department installed 1,226 solar roofs in FY 1998 and another 1,436 solar roofs in FY 1999. These 2,589 solar roofs demonstrate the Department's commitment to the increased use of solar energy and other forms of renewable energy, where it is cost-effective. Passive solar designs, such as building orientation and window placement/sizing, are already being implemented in a variety of building types as part of sustainable design features.

In general, renewable energy projects still are not competitive with other energy projects on a life-cycle

cost basis. The capital costs tend to be high for the energy savings generated, resulting in paybacks that are considerably longer than competing conventional technology. Each of the Services has developed strategies to overcome this problem. The Navy uses the revenue from sales of excess geothermal power at Naval Air Weapons Station (NAWS) China Lake, California to finance additional energy conservation and technology projects. The Army intends to increase their renewable energy program by putting special emphasis on it in their Energy Conservation Investment Program (ECIP) projects and by increasing the use of DOE renewable energy funding programs. The Air Force specifically sought energy service companies (ESCOs) with experience in renewable energy projects for their regional ESPCs.

Washington Headquarters Services (WHS), in collaboration with DOE, and with cost-sharing support from private-sector companies, installed a 15kW photovoltaic panel array demonstration project at the Pentagon Heating and Refrigeration Plant compound. This project demonstrates a new technology—micro-inverters attached to each panel rather than one large inverter on the entire array. This will facilitate the planned increase in size of the array to 60kW in FY 2000. In FY 2001, WHS is planning a roof-top solar hot water heating system for the Pentagon, allowing the steam distribution line serving the building to be secured during the summer months.

The Department also is developing other solar and solar-thermal projects. At Luke AFB, Arizona, an ESCO has proposed refurbishing and modifying existing solar systems to heat water for some dormitories and a nearby dining hall. The National Imaging and Mapping Agency (NIMA), St. Louis, Missouri, is currently investigating solar and other renewable energy projects within the scope of the ESPC that is being implemented, and they are investigating the augmentation of the domestic hot water system with solar heating.

In addition to the application of solar energy, the Department is also committed to other renewable energy technologies. The largest on-going renewable energy project is the 180 megawatt geothermal power plant located at the NAWS China Lake, California. Revenue from the excess electric power from the geothermal plant is used to finance energy cost reduction efforts throughout the Navy.

Other renewable initiatives are being undertaken. Design has been completed on a project to install almost 1,000 geothermal heat pumps at Charleston

AFB. Additionally, Air Force Space Command is designing a project to install more wind turbines and is considering the use of pumped water for energy storage at Ascension Island. The Air Force also asked the Idaho Engineering Laboratory to perform a wind study for a 5 megawatt power plant at Lajes AFB, Azores. Additionally, Sandia National Laboratory has been surveying Nellis, Davis Monthan, Edwards, and Luke AFBs for the Air Force to find potential renewable projects. Finally, DLA has continued testing of solar tracking skylights.

Showcase Facilities

Showcase facilities demonstrate the use of innovative techniques to improve energy and water efficiency. Although hindered by a lack of funding in previous years, the Department intends to emphasize the benefit of these facilities, with a target of developing at least three showcase facilities per year.

Two modifications to existing facilities have been designated showcase facilities by the Air Force. Budget constraints have limited this designation elsewhere within the Department. The two Air Force projects were:

- Dyess AFB, Texas. At the aircraft hanger, supply warehouse, and youth center both active and passive daylighting with lighting controls was installed. 460 units in all were installed.
- Misawa AB, Japan. An ECIP project enabled the replacement of 6 200-ton centrifugal chillers and removed 4,000 pounds of R-11 refrigerant from operation. This produced 9.2 billion Btu in annual energy savings.

Personnel Development

Adequately trained personnel are critical to the safe and efficient operation of DOD utility systems. During FY 1999, more than 1,600 DOD employees received energy management or technical training.

DOD components include specific energy related responsibilities into position descriptions, provide performance recognition programs, and support the use of incentive awards, which are normally implemented at the installation level. The Services and Components have individual awards programs and are also participants in the DOE Federal Energy and Water Management Awards Program. In FY 1999, DOD received 14 awards (6 Army, 4 Navy, and 4 Air Force).

The Army Energy Program Team was the recipient of Vice President Gore's Hammer Award, presented by the Secretary of the Army, the Honorable Louis Caldera on

September 9, 1999. The team is composed of action officers from the Army's Logistics Integration Agency, the U.S. Army Corps of Engineers, and the Office of the Assistant Chief of Staff for Installation Management.

The Navy hosted the FY 1999 annual Secretary of the Navy awards ceremony with the Honorable Robert B. Pirie, Jr., Assistant Secretary of the Navy for Installations and Environment, presenting the awards. Seven awards were provided to Navy and Marine Corps winners in the categories of facilities, ships, and air squadrons.

USAF's Air Education Training Command (AETC) has an energy management incentive award program to award the two best energy management programs in the command each fiscal year. The Air Mobility Command energy awards provide \$400,000 to bases who demonstrate the greatest energy program emphasis and success toward meeting reduction goals. Both awards evaluate both industrial and family housing categories, cumulative energy reduction between the current year and the FY 1985 baseline year, current year and the previous year, and a narrative from each installation detailing their energy program efforts.

DOD components routinely incorporate energy management responsibilities into their unique and respective awards and performance appraisal programs. The Washington Headquarters Service, for example, established an "on the spot" cash award program to recognize outstanding performance in energy management. Most major DOD installations have Certified Energy Managers assigned and installations' performance goals are established at each site level.

DOD emphasizes and supports cost effective training, through recognized professional organizations, DOE and other Government agencies' training programs, multi-media sources and energy management training offered by the Military Services' training programs for all personnel within the Department's energy management community. The Department also participates in the identification and development of long term training needs and initiatives to meet the energy management training and certification requirements, supporting the planned increase in energy and water conservation.

The Army provided energy management training for 685 personnel during FY 1999. The current year cost for the training was \$200,000. The U.S. Army Logistics Integration Agency (LIA) conducts Army Energy Awareness Seminars at approximately 20 installations

per year. A course in energy management for existing facilities for trained Energy Managers is available through the Association of Energy Engineers, and the Army Corps of Engineers in Huntsville, Alabama. LIA has also established an Army Energy Program Home Page on the Internet. It contains numerous reference materials applicable to the energy program as well as an "Ask Captain Conservo" interactive e-mail chat room feature to promote information sharing and interaction within the Army energy management community.

Approximately 415 Navy energy managers/facilities personnel received technical training in areas specified in EPAct. Personnel attended technical courses offered by universities, associations and government agencies. Four sessions of the Navy in-house facilities energy management course were conducted in four different Engineering Field Division regions.

The Air Force Institute of Technology (AFIT) Civil Engineering School at Wright-Patterson AFB, Ohio conducts an Energy Management Training (EMT) course twice a year. AFIT has also incorporated emphasis on energy efficiency in its other technical courses offered, as well as in their on-line computer-training programs. The Air Force uses specialized courses from other sources when the need arises, i.e., a training class by Association Energy Engineers Instructors, provided Certified Energy Manager (CEM) training to 33 individuals. During FY 1999, 299 personnel (from engineering, contracting, legal and comptroller areas) from 41 locations were trained via satellite down-link on the Air Force Regional ESPC program.

Each DOD component has its own unique energy management training plan. Many of them have implemented extensive public relations campaigns. These include recognizing non-energy individuals for conservation efforts, producing stickers for light switches, publishing "how-to" and "point of contact" manuals, and supporting energy poster contests.

Funding

In FY 1999, Congress appropriated \$32.5 million for the ECIP. Although Congress cut all ECIP funding for FY 2000, the FY 2001 President's budget contains \$33.6 million for the program. DOD has typically used ECIP funding to augment private-sector investment and plans to focus more on projects with large energy savings that are not very attractive to the private sector because they require substantial up-front capital investments with long pay-back periods. DOD plans to program about \$50 million per year for the ECIP in the future.

Energy Savings Performance Contracts

In FY 1999, DOD greatly increased the use of Energy Savings Performance Contracts (ESPCs) and utility incentive agreements—saving nearly 1.7 trillion BTU per year, and more than doubling the energy savings obtained the previous year. In excess of \$6 billion in ESPC investment capacity is now available to DOD installations as a result of indefinite-delivery contracts developed by the Military Departments and a memorandum of agreement between the Defense Energy Support Center (DESC) and DOE.

FY 1999 was a record year for the DOD ESPC programs in terms of the number of awards and the magnitude of potential savings (the Defense components awarded 45 ESPC task/delivery orders with an average contract term of 16 years, with an estimated life-cycle savings of nearly \$379 million). The annual energy savings resulting from these awards is estimated to be 1,204,533 million BTU. There are now approximately 70 ESPC projects underway within DOD.

A combined private sector investment capacity of \$3.2 billion is available for use by the Department on one of the existing Defense indefinite delivery indefinite quantity (IDIQ) multi-regional ESPCs, which cover all 50 states and the District of Columbia. Additionally, several Defense components have executed Memorandums of Agreement (MOA) to use DOE Regional or Technology-Specific Super-ESPCs. In June, DESC awarded the single largest ESPC issued by the Federal Government to date, that will use over \$67 million in private capital to install energy savings measures at five bases in the Army's Military District of Washington. This ESPC guarantees an annual reduction of 597.7 billion Btu, annual cost savings of \$11.9 million. There will also be an annual reduction of approximately 24,000 metric tons of greenhouse gas emissions (carbon is the standard for measurements) and more than 600 metric tons of pollutants that cause smog and acid rain, and saves over 50 million gallons of water. Over the 18 year term of the contract, cost savings are expected to total more than \$219 million.

Congress added \$4 million to the Defense-wide O&M account in FY 2000, to assist in training, providing technical expertise and performing energy audits, and otherwise facilitate the ESPC process. This money has been allocated to the components for technical support and project oversight, measurement and validation training, and an ESPC awareness program. DOD will continue to build on its FY 1999 successes with the Military Departments planning to use more than \$1.2 billion in private-sector financing over the next five years.

The Navy has initiated a pilot program that offers some up-front funding to help overcome some of the reluctance of installation commanders to enter into ESPCs. Using FY 1999 operations and maintenance energy program funds, this program invested \$1 million to reduce the capital investment cost of ESPCs.

Utility Projects

There are now approximately 150 demand side management (DSM) and utility partnership agreements in effect at Defense installations.

The Air Force and Navy have continued to aggressively pursue DSM agreements with local utility companies for energy and water retrofit projects. In FY 1999, the Air Force initiated 10 DSM agreements that will initially save 97,877 Btu per year, while the Navy initiated 107 DSM projects. The Navy also invested \$7 million in O&M funds to reduce the amount of project financing required, which installed \$66 million in energy efficiency equipment. Basic ordering agreements are in place with most utility companies servicing Navy activities. These contracts cover a wide range of technologies including lighting, natural gas conversions, controls, and boiler systems. DESC continues to work with the Services and local utilities to encourage the use of these incentives. Other Defense components, including the NSA and DeCA, have entered into long-term electricity purchase agreements with their local utilities that facilitate the use of various financial incentives.

The Department intends to take maximum advantage of electricity rate restructuring to lower its energy costs, and will include green power in its procurements where it is cost-effective. Where practicable, DOD will bundle regionally the diverse loads of DOD installations to create greater buying power. DESC has established a competitive electricity procurement program. Power contracts awarded by DESC in California, Pennsylvania and New Jersey, bundled demand regionally to obtain the best rates possible and resulted in approximately \$825,000 in cost avoidance.

DOD continues its efforts to privatize its utility systems. Defense Reform Initiative Directive #49 directed the Military Departments to develop plans for privatizing all of their utility systems by September 30, 2003. This initiative is designed to allow the Department to manage resources rather than utility infrastructure by using the expertise and investment capital of local utilities and private-sector suppliers to modernize, operate, and maintain DOD's utility systems more efficiently and effectively. The scope of the task is daunting, however, with over 1,500 systems remaining to be evaluated for transfer.

In June 1997, DOD, DOE, and EPA entered into a memorandum of understanding (MOU) regarding ENERGY STAR® labels for all DOD buildings. The MOU considers buildings as ENERGY STAR® Buildings if they were included in comprehensive audits and all projects with a 10-year or better payback are implemented, to the maximum extent practicable, within agency resources. DOD continues to honor its commitment as an ENERGY STAR® Buildings partner with EPA and DOE, to encourage the use of cost-effective, energy-efficient building designs and technologies, and to improve personnel productivity and reduce pollutant emissions. This is reinforced by the Department's commitment to sustainable design.

The Air Force has obtained the ENERGY STAR® information and the DOD partnership agreement and placed it on the AFCESA home page. Additionally, the Air Force has distributed this information to all major commands (MAJCOMs), and is encouraging the MAJCOM/bases to participate in this program. Several Air Force bases have signed up for the "Green Lights" program including Bolling AFB, Maryland; Westover ARB, Massachusetts; and Malmstrom AFB, Massachusetts. At Malmstrom, they have surveyed 74 percent of the facilities and upgraded 31.2 percent of the facilities. For Westover ARB, they have surveyed 64 percent of floor space, and upgraded 46 percent of lighting to "Green Lights" standards.

The Navy has surveyed approximately 51 percent of its facilities and installed approximately half of the projects identified. The other DOD components occupy fewer facilities, operations are smaller in scope, and typically have fewer resources and opportunities to implement the principle of the ENERGY STAR® Program. However, they are all partners and support and implement ENERGY STAR® principles as resources allow.

Procurement of Energy Efficient Products

The Department is committed to actively searching the competitive markets to identify and procure energy efficient products for facilities and equipment, as required by the 1992 Energy Policy Act. The Defense Logistics Agency (DLA), is working closely with other Federal agencies, such as the Department of Energy's Federal Energy Management Program and GSA, to identify energy efficient products. The FEMP, GSA and DLA product catalogs are widely used within DOD. Although no specific procurement targets exist within the Department, purchasing agents, including users of government credit cards, are encouraged strongly to procure ENERGY STAR® products and products in the

top 25 percent of energy efficiency, when they are cost-effective.

DOE and GSA were tasked with identifying energy efficient products for the Federal Government. The Navy was an active participant in the GSA working group of Energy Efficient Products. The Department concentrated its efforts on making use of the guidance generated by the lead agencies. In addition, the Navy recommends that energy managers utilize the DLA lighting catalog and Washington State Energy Office Motor-Master database to assist in purchasing energy efficient equipment. The recently published DOE resource of energy efficient products was distributed to all Navy energy managers in FY 1999. Energy managers were encouraged to ensure planners, estimators and other procurement officials received the DOE guidance.

During programming and early design reviews of renovation projects, the Air Force encourages the use of highly energy efficient products such as lighting, motors, and chillers. Criteria have been provided to the base level designers to purchase only energy efficient equipment (based on life-cycle cost). The Air Force continues encouraging energy managers to use the references in the Construction Criteria Base (CCB), the DLA lighting catalog, and the electronic version of E-Source, delivered to all installation energy managers.

Other Defense components follow DOD and other Federal guidance in planning, procurement and use of cost-effective energy efficient and environmentally preferred products. Most locations support recycling of toner cartridges and other materials (paper, aluminum, glass, and plastics).

Alternative Fueled Vehicles (AFV)

In FY 1999, DOD acquired 2,712 AFVs. In addition, the Department received 102 extra AFV credits for acquiring medium- and heavy-duty AFVs, for a total of 2,814 AFVs and credits. The total of 2,814 AFVs and credits for FY 1999 represent an increase of 549, or 24 percent, over the FY 1998 total of 2,265 AFVs and credits included in last year's DOD report. DOD's acquisition rate for AFV increased from 32.3 percent in FY 1998 to 36.6 percent in FY 1999.

DOD continues to take steps in the areas of policy, management and oversight, and budget to achieve compliance with the requirements of Executive Order 13031, "*Federal Alternative Fueled Vehicle Leadership*." With original equipment manufacturers making more AFV models available, and with use of biodiesel now counting toward achievement of AFV goals, DOD

expects to continue to increase the percentage of AFVs that it acquires.

The Department does not have an automated system to identify, collect, record, and report alternative fuel usage data. Developing such a system at a time when DOD is still striving to ensure that sufficient funds are available to meet mandated AFV acquisition requirements, is cost prohibitive. Manual collection of the data is also cost-prohibitive. Thus, DOD is able to provide only an incomplete estimate of alternative fuel used in FY 1999. One major obstacle to collecting and reporting alternative fuel usage data is that the Government credit card system currently is unable to collect and report detailed data, known as Level 3 data, on the types of fuel being purchased. DOD will continue to work with GSA so that in the future DOD will be able to obtain more complete data on the types of alternative fuel purchased with Government credit cards.

Environmental Benefits of Energy Management Activities

The Department closely coordinates its energy management and environmental programs to take full advantage of their synergy. As a result, DOD has been very successful in reducing its greenhouse gas emissions. From FY 1998 to FY 1999, DOD installations reduced their carbon emissions by 1.2 percent.

The Navy, through its energy program efforts, reduced carbon equivalent emissions by approximately 500,000 metric tons carbon equivalent compared to emissions in FY 1985. At a cost of \$3 per ton for externalities, the reductions are worth \$1.5 million annually.

The Air Force's windfarm and photo voltaic systems at Ascension Island reduce greenhouse gases by 2.9 million pounds per year for carbon dioxide and 103,000 pounds per year for nitrous oxides. In addition to the direct environmental benefits of energy conservation, the Air Force has also realized the following indirect environmental benefits:

- Under a DSM contract with Virginia Power, Langley AFB, Virginia has disposed of all the obsolete ballasts as part of the \$10.8 million delivery order which involved lighting and HVAC for 15 buildings. The cost to dispose these obsolete ballasts was \$23,200.
- An ECIP project at Mt. Home AFB, Idaho replaced 13 oil-fired boilers in 13 facilities with high efficiency natural gas boilers. As part of the environmental clean up program, the 13 oil tanks were removed.

- Offutt AFB, Nebraska eliminated 1400 pounds of the CFC refrigerant R-11. An FY 1999 ECIP project for Building 304 eliminated an additional 7200 pounds of R-11.

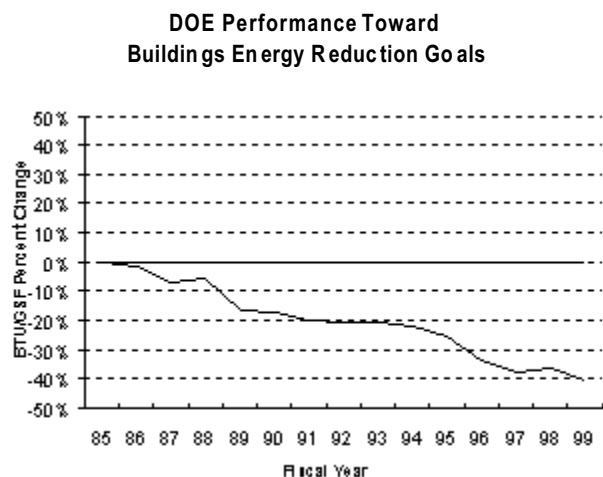
Energy Management Contact

Captain Kevin E. Mikula
Director, Energy Office
Housing and Energy Directorate
Office of the Under Secretary of Defense
for Installations
3000 Defense Pentagon, Room 3D-784
Washington, DC 22301
Phone: 703-697-6195
Fax: 703-695-1493

4. DEPARTMENT OF ENERGY (DOE)

Energy Efficiency Performance and Implementation Strategies:

For FY 1999, the Department of Energy reported a decrease in energy consumption in buildings of 38.5 percent in Btu per gross square foot compared to FY 1985.



Energy Buildings Energy Use and Costs, FY99

	BBtu	\$(Thou.)
Electricity	10,355.3	144,917.4
Fuel Oil	608.1	2,247.7
Natural Gas	6,253.5	22,596.7
Propane	38.4	235.3
Coal	2,720.4	4,136.9
Purchased Steam	1,720.6	12,024.4
Other	34.1	715.1
Total	21,730.3	186,873.4

This reduction is partially due to reduced mission-related activities and overall downsizing of operations and facilities. As manpower is reduced and facilities are closed, efforts are ongoing to consolidate operations and minimize energy use in vacated buildings. This includes review of heating, ventilating, and air conditioning (HVAC) systems; lighting; transformers; and other building equipment usage. Appendix A includes a comparison of DOE's energy consumption and costs for FY 1999 with FY 1985 for specific fuel types within each of the three end-use sectors: Buildings and Facilities, Metered Process Facilities, and Vehicles and Equipment.

DOE's metered process facilities, excluded from the 30 and 35 percent reduction goals of Executive Order

13123 for standard buildings, saw a reduction in Btu per gross square feet of 64.9 percent since FY 1985. This reduction is mainly attributable to reduced mission-related activities and overall downsizing of operations and facilities.

As directed by Executive Order 13123, DOE has designated Deputy Secretary of Energy, T.J. Glauthier as the senior official responsible for meeting the goals and requirements of the Order. DOE also designated a senior level Agency Energy Team consisting of: Dan W. Reicher, Assistant Secretary for Energy Efficiency and Renewable Energy; Michael L. Telson, Chief Financial Officer; Richard H. Hopf, Director of the Office of Procurement and Assistance Management; and Elizabeth L. Shearer, Director of the Federal Energy Management Program, to expedite and encourage use of appropriations, energy savings performance contracts, and other alternative financing mechanisms necessary to meet the goals and requirements of the Order.

In FY 1999, the Department's Energy Management Team assisted the efforts of the Energy Management Steering Committee (EMSC) to reduce energy costs by integrating all energy management activities into DOE program operations. The EMSC is comprised of Federal Energy Management Program and DOE Secretarial Officer representatives. It establishes and implements internal policy for energy management, and integrates these activities into DOE program operations. The EMSC looked beyond the 35 percent reduction goal of Executive Order 13123 by outlining key elements for reducing energy consumption per square foot by 40 percent in 2005 (from the 1985 base year). These key elements are:

- Phasing out Class 1 ozone-depleting refrigerants in old chillers;
- Reducing energy consumption in surplus facilities;
- Procuring energy-efficient products (lighting, CFL's);
- Achieving ENERGY STAR® labels for DOE office buildings;
- Adopting sustainable guidelines for all new buildings; and
- Procuring cost-effective renewable energy systems and electricity.

In 1999, the EMSC agreed that all DOE sites would begin reporting greenhouse gas emissions using data from its energy data collection and reporting system (EMS3) in adherence to the Energy Information Agency's voluntary program. DOE has set a goal to reduce greenhouse gas emissions by 35 percent in the year 2010 (from 1990 base year). This exceeds the 30 percent goal set by Executive Order 13123.

Additionally, the EMSC established guidelines to achieve the Secretary's "Phaseout Goal for DOE's Air-Conditioning and Refrigeration Chillers to Protect the Ozone Layer and to Reduce Energy Costs." DOE will replace or retrofit all of its chillers that use Class 1 refrigerants by 2005. Meeting this goal would eliminate 50 percent of Class 1 refrigerant use by DOE, as well as reduce energy costs by \$6 million annually. The "Phaseout Goal" will be reached by developing:

- Refrigerant management plans;
- Guidance on disposition of Class 1 refrigerant;
- Energy management plans and programs; and
- Chiller exemption process when retrofitting or replacement is not cost effective.

DOE is adopting sustainable design for its new construction and major renovations. Sustainable Design uses a life-cycle cost effective integrated approach to appraise all elements of a building to minimize its impact on the environment.

Many DOE sites have implemented a number of ongoing energy-saving measures resulting from previously funded comprehensive audits such as installing energy monitoring control systems, replacing mercury vapor lamps with higher efficiency metal halide lamps, replacing old fluorescent lamps and ballasts with high-efficiency lamps and electronic ballasts, installing automatic on-off control systems for lighting, installing and replacing building satellite boilers, and maintaining and upgrading HVAC equipment and systems to optimize performance. DOE also seeks to improve energy efficiency through efficient operation of buildings, improved preventive maintenance, and improved energy training for personnel.

Examples of operational and energy efficiency projects accomplished in FY 1999 include:

- The Albuquerque Operations Office completed a number of HVAC and lighting retrofits at the Waste Isolation Pilot Plant (WIPP). The Kansas City Plant (KCP) accomplished several energy conservation activities, including upgrading

boilers, installing direct digital controls, replacing CFC chillers with 134a chillers, installing new steam traps and KCP's plate/frame heat exchanger project, and free cooling during the winter. The Pantex Plant installed photocells on outside lighting, identified and repaired leaking water lines, tuned boilers, right-sized a new air compressor (saving more than \$36,000 per year), installed new steam traps, installed variable-frequency drives, repaired natural gas line leaks, and right-sized chilled water pumps. Pantex also has a water conservation project under construction that will replace domestic water chlorine injection at the sewer plant with sewer water chlorine injection, saving more than 15 million gallons of water per year. The Los Alamos National Laboratory (LANL) audited five buildings and four transportable buildings. The audit identified measures that, if implemented site-wide, could save \$4.3 million annually. LANL installed 64 infrared occupancy sensors in offices, conference rooms, and hallways in six buildings. Sandia National Laboratory improved their energy management control system with a demand-based control strategy, reducing run time of fans and pumps, and reducing simultaneous heating and cooling. One building was completely retrofitted, changing 6,000 lamps from T-12 to T-8 and eliminating more than 1,000 ballasts. Annual savings are estimated at 250,000 kilowatt-hours, with simple payback period of three years. Twelve remote area buildings were converted from propane to natural gas-fired boilers, saving \$70,000 a year. Also, a 1-million-gallon chilled water storage tank, rated for 10,000 ton-hours of chilled water capacity, was constructed. When this is integrated with the existing chilled water plant, annual savings of \$150,000 are expected.

- Argonne National Laboratory-East completed two projects: implementing heat recovery in 200 Area Buildings (\$500,000, with a 3.4-year payback period), and improving raw water distribution (\$260,000, with a 4.4-year payback period).
- The Rocky Flats Environmental Technology Site (RFETS) performed a SAVEnergy audit of 12 buildings along with an energy consumption analysis of 69 other typical buildings, installed two package boilers to improve steam feed efficiency, and reduced exterior lighting at the east and west entry gates.
- The Idaho National Engineering and Environmental Laboratory (INEEL) performed facility audits that developed 274 conservation opportunities. If

implemented, these would save more than \$51,000 annually. An excess buildings study was completed, finding that actions completed to date are saving \$269,200 per year. During the next five years, an additional \$149,200 will be saved as eight other buildings are removed from service. Total annual savings are estimated to be \$420,000. INEEL also installed occupancy sensors, setback thermostats, and LED exit lamps.

- Bonneville Power Administration (BPA) has installed a cooling tower water treatment device at Dittmer Control Center that filters out particles in the loop resulting in savings of nearly 12,000 gallons of water a day and \$17,000 annually. This system will serve as a model for several cooling towers at the Celilo Converter DC Station. Radiant heaters have been installed in garages where the external temperatures can reach -25°F. By heating an object and not the entire space, these measures have reduced the energy bill by 30 percent. BPA replaced a 60 ton air conditioner with a 12 ton unit at the Alston Substation and will save \$20,000 annually.
- The Ohio Field Office's Fernald Environmental Management Project switched to a smaller cooling tower, decreasing the cooling water loop length and reducing pumping energy.
- Pacific Northwest National Laboratory improved energy-related operations and maintenance in the William R. Wiley Environmental Molecular Sciences Laboratory. Early results indicate annual savings of \$100,000.
- The Richland Operations Office upgraded the lighting system at the Fuels and Materials Examination Facility. At the Plutonium Finishing Plant, 900 standard fluorescent light fixtures were replaced with T-8s and electronic ballasts, and fan motors were upgraded. Numerous general-purpose facilities also had T-12 fixtures (7,550 in all) replaced with T-8s, saving more than 140,000 kilowatt-hours and \$3,533 annually. Also during FY 1998, 13 transformers were removed and 7 were exchanged, reducing energy consumption and costs by more than 325,000 kilowatt-hours and \$7,800.
- The Nevada Operations Office installed energy-efficient lighting in the Remote Sensing Laboratory. This project included replacing magnetic ballasts and T-12 lamps with energy-efficient electronic ballasts and T-8 lamps with

reflectors. Total estimated annual savings are \$52,500.

- The Lawrence Livermore National Laboratory completed nine energy conservation projects. The projects consist of DDC system installations, lighting retrofits, occupancy sensor installations, and HVAC upgrades. Total construction cost was \$1.36 million with a cumulative payback period of 3.3 years.
- Brookhaven National Laboratory (BNL) began five new projects. These are an energy management control system optimization, insulation of steam stations and manholes, exit sign LED retrofits, installation of a side-stream filter for the Central Chilled Water Facility's refrigeration machines, and HVAC balancing.
- Bettis Atomic Power Laboratory completed roof repairs and insulation, occupancy sensor installations, central heating plant improvements, improvements to the energy management system for building HVAC controls, installation of an efficient vacuum pump system, and the installation of efficient heaters on the Corrosion Laboratory autoclaves. Energy savings of 14.5 billion Btu were achieved.
- The Oak Ridge Operations Office completed several projects. The Oak Ridge Institute for Science and Education (ORISE) replaced an inefficient electric HVAC system with a digitally controlled system with natural gas heating, and completed a multi-site energy audit, an energy conservation baseline study, an HVAC system study, and a lighting system upgrade. ORISE also completed a multi-phase retrofit construction project at the sites 2714FG Building, which included installing dual glazed windows, attic insulation, and T-8 fluorescent fixtures and electronic ballasts.
- The National Energy Technology Laboratory (NETL) completed a preliminary energy audit for both its Pittsburgh, Pennsylvania, and its Morgantown, West Virginia sites. NETL also began a lighting retrofit at its Morgantown day care facility.
- The Federal Energy Regulatory Commission (FERC) retrofitted all incandescent lights in common areas and department head offices with compact fluorescent bulbs, saving 79,120 kilowatt-hours and more than \$6,300 per year. It also removed 48 recessed incandescent lights in 16 locations, saving 11,232 kilowatt-hours and nearly

\$900 annually. Variable speed drives were installed on fans and water pumps, saving at least 123,000 kilowatt-hours annually.

- Lawrence Berkeley National Laboratory (LBNL) completed eight energy efficiency retrofits. These measures included lighting retrofits, installing variable frequency drives, variable speed drives, boiler retrofits, HVAC replacements, cooling tower efficiency improvements, and installing lighting controls. Estimated annual cost savings are \$154,000. The annual energy savings of nearly 3,000 megawatt-hours will avoid emissions of 725 tons of carbon dioxide, 1.8 tons of nitrogen oxides, and 0.6 tons of sulfur dioxide.
- The Stanford Linear Accelerator Center started a project to install programmable thermostats at packaged HVAC units.

Solar and Other Renewable Energy

FEMP's Departmental Energy Management Team is actively promoting solar and renewable energy and the President's Million Solar Roofs Initiative, and DOE has solar and renewable projects at the following DOE sites:

- Forrestal and Germantown Headquarters, photovoltaic and solar hot water heating systems;
- LBNL, solar hot water heating system;
- Nevada Test Site, nine photovoltaic systems;
- Western Area Power Administration, two photovoltaic systems;
- National Renewable Energy Laboratory (NREL), passive solar design features and daylighting, trombe wall and photovoltaic systems;
- Sandia National Laboratory (SNL), ground source heat pumps, daylighting, passive solar design, trombe wall, hot water heating system;
- WIPP, skylights/daylighting; and,
- Oak Ridge National Laboratory (ORNL), passive solar building.

Funding

DOE received no direct appropriations for in-house energy management during FY 1999. No funds have been appropriated by Congress for DOE in-house energy efficiency projects since FY 1995 when DOE

received \$30 million. However, the FEMP-Departmental Energy Management Team and the EMSC worked to provide DOE sites with \$6.4 million in energy retrofit project funding in FY 1998. These funds were made available after being returned by DOE field sites to FEMP from previous projects that were completed but still had funds remaining. In response to requests for project submissions, over 60 projects were submitted with more than \$25 million in total estimated cost. Of these, 32 projects were selected with an average simple payback of 3.5 years. The FEMP-Departmental Energy Management Team has also provided funds to support development of energy savings performance contracts and utility contracts at 12 DOE sites.

DOE has requested \$5 million for energy efficiency projects for FY 2001.

Energy Savings Performance Contracts

Obtaining alternate financing for energy efficiency projects is considered vital to continued energy reductions. DOE has awarded five site-specific ESPCs to date and is working on several other projects:

- Savannah Operations Office awarded an ESPC to CES/Way International (now Sempra Energy Services) on March 2, 1998. The primary focus of the Savannah River Site Energy Management Team was developing Task Orders, the first of which was approved in FY 1999. Task 1 consists of upgrades in 16 administrative facilities. A total of 540,000 square feet was audited resulting in \$1,655,000 in capital upgrades. Guaranteed energy and O&M savings are approximately \$268,000, due to improvements such as lighting enhancements, energy management control system installations, and HVAC modification.
- The Richland Operations Office's Hanford Site awarded an ESPC in FY 1997 to Johnson Controls, Inc. During FY 1999, the 200 East and 300 Area steam plants were closed and replaced with 42 state-of-the-art package boilers. The new boilers eliminate steam and condensate discharges and reduce energy consumption by 30 percent. More than \$108 million in energy and related operations and maintenance expenses will be saved over the 25 year contract term.
- The Albuquerque Operations Office's Waste Isolation Pilot Project began work to utilize DOE's regional Super ESPC. The initial Request for Proposal (RAP) targets the main chillers, variable-frequency drives for the main underground ventilation fans, DDC for monitoring and control,

and several lighting projects. Estimated investment is \$3 million, with a 15-year payback. The Pantex Plant received a final proposal for \$4,473,000 of energy conservation measures with a simple payback period of 9.6 years. Two million square feet of plant floor space will be audited. Utility incentives of more than \$2.6 million over the project's life have been identified.

- LANL entered into an agreement with its support services subcontractor whereby the contractor would perform ESPC tasks at LANL. One chiller replacement is at the approval stage for construction, one lighting and HVAC upgrade is at the energy audit stage, and a steam plant and another lighting retrofit are at the proposal stage.
- INEEL submitted a delivery order for the Western Regional Super ESPC. This initial delivery order included lighting and transformers.
- The Nevada Operations Office has an ESPC study near completion, which proposes to use efficient technologies in lighting, HVAC, and energy management control systems. A delivery order is expected during FY 2000.
- ORNL engaged an ESCO through the Southeast Regional Super ESPC. A delivery order covers four buildings, involving lighting, chillers, variable frequency drives, and water fixtures.
- NREL has initiated a delivery order under the Mid-Atlantic Regional Super ESPC and selected EUA Cogenex/SAIC as the ESCO.

Utility Partnerships

DOE sites continue to participate in and provide utility company incentives and demand-side management programs. Examples include:

- Argonne National Laboratory (ANL) developed an agreement with Commonwealth Edison to provide energy conservation projects under their utility incentive program initiative. The first delivery order for a pump motor replacement was valued at approximately \$180,000. ANL also continued its participation in Commonwealth Edison's demand-side reduction program, receiving more than \$450,000 in compensation. ANL also negotiated a reduced rate from the local gas utility.
- Pumps at the Strategic Petroleum Reserve's (SPR) Raw Water Intake Structure (RWIS) were increased in size, warranting an increase in the size

of Entergy-owned transformers providing power to the RWIS. SPR negotiated an agreement with Entergy to off-set the cost of construction with actual power usage from the site, saving about \$200,000 during the contract period. Three field sites, Bayou Choctaw, Big Hill, and both West Hackberry substations use Entergy's time of use rate for annual savings of approximately \$350,000. Also, the Bryan Mound site is using an interruptible service rate from Houston Lighting and Power.

- BNL modified its contract with the New York Power Authority (NYPA) to save \$2 million. To date, this has saved BNL more than \$190,000 in fuel costs by switching to natural gas compared to the cost of the previously used fuel oil.
- LBNL equalized its electrical energy rates with Lawrence Livermore National Laboratory's (LLNL) rates, which have been historically lower. This change to the 3-Lab (LBNL, LLNL, and the Stanford Linear Accelerator Center) Rebilling Systems will save LBNL an estimated \$800,000 per year.
- The Richland Operations Office started its comprehensive energy management plan and entered into a utility agreement with BPA for energy management services.

At the end of FY 1999, DOE's utility purchasing function was moved from the Office of Field Management to FEMP's Departmental Energy Management Team. The active Utility Program has made continual progress in reducing the cost of utilities to a current \$.047 per kilowatt-hour. This has been accomplished with wheeling of low cost power from the Power Marketing Administrations to DOE sites, and competitive procurement of natural gas and electricity at a number of DOE sites. DOE has also pursued green power purchases at the following sites:

- NREL, commitment for wind power purchase;
- Richland Operations Office, completed study, action pending with a BPA rate case resolution; and
- Albuquerque Operations Office, Public Service Company of New Mexico completed a request for proposals for a solar plant that will eventually provide service to DOE sites.

Vehicles

DOE has an ongoing program to improve vehicle efficiency, including acquiring alternative-fueled vehicles, downsizing vehicles when appropriate, upgrading preventive maintenance programs, improving maintenance techniques, expanding waste minimization programs, implementing driver awareness training, and providing employee outreach.

Fleet vehicles at a number of DOE sites were, or will soon be, converted from gasoline to methanol or dual fuel. Liquified petroleum gas, liquified natural gas, compressed natural gas, electricity, and biodiesel gas are some of the alternate fuels currently in use.

Most DOE sites have an ongoing employee commuter program. These programs promote using ridesharing and mass transit services, as applicable at each site. A transportation coordinator at each site promotes these efforts, as appropriate.

DOE has been turning over more of its fleet operations to GSA to take advantage of their vehicle programs. This provides the benefit of having an ever more efficient, and less costly to maintain, vehicle fleet.

Environmental Benefits of Energy Management

DOE continued to focus on reducing CFCs by replacing CFC chillers with new higher efficiency, non-CFC chillers and refrigerant recovery programs. Other measures include fluorescent lamp recycling, procuring recycled goods and products such as printer/copier toner cartridges and paper products, reducing power plant emissions, and reducing automobile emissions through the use of compressed natural gas at many DOE sites. Soy-based inks, which are environmentally friendly, are used in DOE printing plants. Site-wide recycling of aluminum beverage cans, batteries, cardboard, paper products, and fluorescent lamps occurs at many DOE sites. Examples include:

- ANL found an outlet for recycling fly ash produced at the ANL steam plant. More than 700 metric tons per year is being converted into a by-product, saving \$40,000 to \$80,000 per year.

- The Savannah River Operations Office implemented the GeoSiphon Cell as a remediator of contaminated groundwater. This is an emerging technology developed on site, that is a reductive de-chlorination process, utilizing induced flow, to draw contaminated groundwater through a treatment cell. In addition to the positive effect on the environment there is a savings of \$1.20 per 1,000 gallons. A total of 12 chillers were replaced with 9 new, non-CFC chillers as part of a project to replace 37 major refrigeration units at the site.
- SPR has minimized biohazards by modifying its supply system. For example, aerosol spray painting has been banned. SPR eliminated the use of SPR-owned equipment containing polychlorinated biphenyls (PCBs). Also, the SPR completed an inventory of all utility-owned electrical equipment for PCB content. The amount of PCBs involved was documented, and plans have been developed to assure the PCBs are not introduced into the environment.
- ORNL replaced four chillers totaling 1,746 tons of rated capacity with more efficient, non-CFC chillers. The new chillers save approximately 20 percent in chiller energy. Four additional chillers will be replaced by FY 2003.
- Nevada Operations Office has replaced two 195-ton chillers. The Nevada Operations Office recycles all petroleum waste products at the Nevada Test Site by placing refined products back in service.

Energy Management Contact

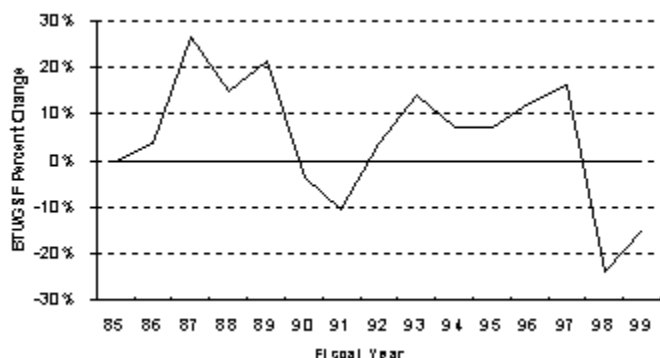
Mr. Victor Petrolati, EE-91
DOE Energy Management Team Leader
Federal Energy Management Program
Office of the Assistant Secretary for Energy Efficiency and Renewable Energy
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0121
Phone: 202-586-4549
Fax: 202-586-3000

5. DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Health and Human Services reported a decrease in energy consumption in buildings of 14.6 percent in Btu per gross square foot compared to FY 1985.

HHS Performance Toward Buildings Energy Reduction Goals



HHS Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	1,112.2	19,654.0
Fuel Oil	206.3	1,339.0
Natural Gas	1,312.4	4,066.0
Propane	118.2	790.0
Coal	46.9	116.0
Purchased Steam	14.6	219.0
Total	2,810.6	26,184.0

While HHS is fine-tuning each of its operating components energy plans in order to fully meet Executive Order 13123 energy targets, further DOE funding for energy conservation projects would be very helpful to the success of the Departments program. Although HHS's estimates show that direct agency funding for projects in FY 2000 will be roughly 3.6 million dollars, this still falls short of the funding needed to meet the aggressive energy reduction goals. HHS will rely more on energy savings performance contracting (ESPC) and other alternative financing methods to meet its energy mandates. In FY 1999, four alternative financing agreements were signed to implement energy and water conservation projects that will save approximately \$1 million in annual energy costs. The outlook for FY 2000 is promising, as many more HHS facilities are expected to use ESPC or are in the process of investigating the benefits and impact of this contracting mechanism.

Preventative maintenance programs are widely used throughout HHS's Operating Divisions (OPDIVs) to maintain the highest efficiency output of mechanical equipment. The larger HHS facilities use energy management and control systems. These systems are continuously enhanced to increase their span of control and their energy saving capacity. The smaller facilities take advantage of stand-alone thermostatic controllers. Timers are used to start and stop HVAC equipment and control lighting.

The Indian Health Service (IHS) Albuquerque Area has a goal to replace existing pneumatic controls, in all Area hospitals with new direct digital controllers and computer-based energy management systems.

As of FY 1999, 30.2 percent of the HHS square footage has been audited. These audits have been performed by utility companies, energy service companies, in-house personnel, university engineering students, university Industrial Assessment Centers, and the DOE SAVEnergy Audits program. Approximately 30 percent of the total National Institutes of Health (NIH) space has been audited.

Energy and water conservation projects and initiatives performed during FY 1999 include:

- The Center for Disease Control and Prevention (CDC) Clifton Road facility in Atlanta, Georgia had a comprehensive audit completed as part of an ESPC. Several energy conservation measures were recommended including a lighting retrofit that will be completed in FY 2000.
- The Food and Drug Administration's (FDA) Winchester Engineering and Analytical Center (WEAC) in Winchester, Massachusetts implemented a lighting upgrade project.
- The FDA's National Center for Toxicological Research (NCTR) in Jefferson, Arkansas installed new cooling towers, fan and pump motors, variable frequency drives, and power factor corrections.
- An FDA laboratory in San Juan, Puerto Rico installed a new HVAC rooftop unit and energy-efficient lighting.
- The Indian Health Service (IHS) Albuquerque Area has installed a thermal groundwater-source loop system to a hospital that has both individual and rooftop heat pumps for heating and cooling.

- Several energy conservation measures were installed at various IHS facilities across the nation including lighting retrofits, boiler and chiller upgrades, HVAC system improvements, and window and building envelope upgrades.
- The Program Support Center's (PSC) Parklawn Building installed water conserving toilets and faucets and implemented a lighting retrofit. Expected annual savings are \$270,000 with a simple payback of five years.
- NIH is currently expanding its power plant to provide necessary utilities for new and existing buildings on its Maryland campus. During the design and construction phases of the facility renovation many energy conservation measures were installed. Annual estimated savings are \$1.59 million, or 6 percent of the annual energy costs.
- The NIH National Institute of Environmental Health Sciences (NIEHS) in Research Triangle Park, North Carolina installed a new energy-efficient chiller.
- The NIH Rocky Mountain Laboratory in Denver, Colorado is undergoing a major renovation that will include energy-efficient equipment.
- The NIH Bethesda campus modified the chiller control software to allow the chillers to run at a reduced condenser water temperature of 65°F rather than 85°F during the off-summer months. The annual reduction in power use is estimated at 576 megawatts.
- The NIH's Gerontology Research Center (GRC) in Baltimore, Maryland saved approximately \$362,400 by adjusting building temperatures and turning off unused lights and equipment. A lighting retrofit is underway and a steam recovery unit is planned for installation in FY 2000.
- The Office of the Secretary (OS) plans to upgrade HVAC motors at the Hubert H. Humphrey Building during FY 2000.

Solar and Other Renewable Energy

In FY 1999, the HHS Energy Officer aggressively worked with the OPDIVs to explore the installation of renewable energy applications. The Assistant Secretary of Management and Budget wrote a memo to the OPDIV heads concerning the Million Solar Roofs Initiative and the importance of renewable energy to the

Federal government, taxpayers, and the environment. HHS continues to follow up on this memo with each OPDIV to ensure that the investigation of renewable technologies are included in all ESPC studies and analyses, comprehensive energy audits, and funding of energy efficiency projects.

IHS makes extensive use of renewable technologies. Examples include:

- An Aberdeen Service Area hospital installed a thermal protection system to prevent a dangerous overheating potential. This system cost about \$150,000 and was funded by the FY 1999 IHS non-recurring M&I funding.
- The National Renewable Energy Laboratory (NREL) awarded a grant to IHS to install four solar lights at the living quarters of the IHS Acoma-Canoncito-Laguna Hospital in New Mexico. NREL also awarded a grant to the Santa Fe Indian Hospital to study the refurbishment of a 20-year-old solar system.
- The IHS Billings Area is considering the installation of an experimental solar generator in Fort Washakie, Wyoming. The project was proposed by the local utility company.
- The IHS Phoenix Area is planning to install a flat plate heat exchanger at the San Carlos Indian Hospital, enabling the central cooling system to use chilled water directly from the cooling tower under certain weather conditions. Significant energy savings are expected.
- In FY 2000, the IHS Anchorage Area will install a groundwater source cooling system in the Alaska Native Medical Center (ANMC) to supplement the building chiller cooling capacity. The project will take 38°F groundwater through a heat exchanger to provide 44°F chilled water, in lieu of utilizing the existing three rotary screw chillers. The preliminary cost estimate for the project is approximately \$356,000 with a simple payback of 7 years. Savings will total more than \$50,000 per year.

Also in FY 2000, the PSC Parklawn Building will study the application of a solar wall to preheat combustion air for the house boiler. A roof-top PV collector system for domestic hot water heating will also be analyzed.

In addition, NIH will perform feasibility studies in FY 2000 to determine the potential application of renewable energy technologies at its sites.

Showcase Facilities

The 1999 HHS showcase facility is the NIH Consolidated Laboratory Facility, Building 50 in Bethesda, Maryland. The energy-efficiency technologies installed at this site will save more than \$1 million annually, which is more than 40 percent of the potential energy use without the measures.

Personnel Development

Six FY 1998 HHS Energy and Water Management Awards were awarded to HHS personnel for outstanding achievements in the conservation and efficient use of energy and water. The program is administered by the Division of Policy Coordination, located within the Office of Facilities Services, Assistant Secretary for Management and Budget.

Night-time audits were performed in three HHS facilities at the end of FY 1999. The audits were desk-to-desk with the purpose of increasing public awareness of energy efficiency in the workplace. Notes were left on employees' desks that either commended them for having all lights and office equipment turned off, or reminded them to do so. Stickers, magnets, and information cards were also placed at employees' desks and work areas.

There are two employee incentive programs at OS; the Special Achievement Award and On The Spot Awards. Employee excellence is recognized, including energy related performance. The HHS energy officer and contracting staff were awarded a 1999 Federal Energy and Water Management Award.

HHS energy and facility related personnel receive energy management training based on scheduling opportunities and available funding.

HHS held a one-day energy seminar in FY 1999. Energy managers and engineers from around the country attended the seminars to learn the latest on federal energy efficiency. Speakers from DOE, NREL, HHS, and private industry presented a wide array of energy efficiency topics including alternative financing using actual HHS case studies, renewable energy opportunities, water conservation, and new technologies.

The IHS energy coordinator continues to offer a one-week course for the IHS Area engineers and facility managers as well as other HHS personnel. At the

completion of this course, the attendees have the option of taking a four-hour exam administered by the Association of Energy Engineers for energy manager certification.

IHS and Washington State University teamed up to offer a 3-day hands-on HVAC training seminar at four IHS Portland Area facilities. The seminar discussed topics which will familiarize facility maintenance staff with energy efficient HVAC operations and maintenance and trouble shooting procedures.

Funding

The HHS energy projects completed or began in FY 1999 have been funded by direct agency expenditures, through ESPCs and utility partnerships, and GSA delegated agency funding. Utility rebates were requested wherever possible. The total amount invested in energy and water efficiency projects in FY 1999 was \$4.8 million, which was more than twice the funding spent in FY 1998. In FY 2000, direct agency funding for energy and water projects is estimated at \$3.6 million.

OPDIV energy efficiency and water conservation project funding was reported as follows:

- CDC spent \$196,000 on energy conservation projects primarily consisting of HVAC replacements and upgrades. ESPC was used for lighting upgrades.
- Direct agency funding of \$265,000 was spent on FDA laboratory upgrades consisting of HVAC and lighting improvements. A power factor correction project was also directly funded at the FDA NCTR. The project cost was approximately \$35,000 and is expected to have a simple payback period of two years.
- IHS spent \$4 million on projects covering the full spectrum of energy efficiency measures. The projects included implementation of a thermal ground-source heat pump loop system to replacing large central boilers and chiller, lighting system upgrades, boiler and chiller replacements, building envelop improvements, building control system installations and upgrades, medical waste incinerator upgrade, domestic hot water heater replacements, air compressor upgrade, window replacements, HVAC system upgrades to energy efficient models fuel source conversions, free cooling system installation using flat plate heat exchanger, and energy auditing.

- OS used \$45,400 of direct agency funding to upgrade lighting systems, track utility consumption, improve HVAC equipment, and evaluate generator efficiency and operations. Major HVAC equipment cleaning was completed with \$70,000 of GSA delegated agency funding.

Energy Savings Performance Contracts

FY 1997 was the inaugural year for HHS involvement in ESP type-contracts, and since that time five ESP-type contracts have been signed. Seven more are expected to be signed in FY 2000.

- CDC facilities in Atlanta will begin a super ESPC in early FY 2000. This will be a contractor-identified delivery order and should result in a completed delivery order by FY 2001. The Interagency Agreement and Memorandum of Understanding (MOU) have already been signed by both CDC and DOE.
- The CDC office in Cincinnati has interviewed Sempra Energy regarding the use of a super ESPC. Several ideas were discussed such as lighting, boiler and chiller retrofits, along with reducing the demand change. The target date for having a delivery order in place is the 4th quarter of FY 2000 or the 1st quarter of FY 2001.
- The IHS Aberdeen Area and Seattle Engineering Services has signed an MOU with DOE for implementation of a Super ESPC delivery order at 28 facilities in North and South Dakota. The IHS ESPC Team has issued a Task Order to Johnson Controls to perform a detailed energy audit in order to verify energy saving opportunities prior to awarding a contract. The delivery order should be awarded in February 2000. The IHS Oklahoma City (OKC) Area is also investigating Super ESPC. The Area office has received a proposal for energy conservation measure at three hospitals and one health center. However, since many IHS hospitals and clinics are being turned over to the Tribes, the OKC Area is awaiting a decision from the Office of General Counsel on whether the agency should enter into long-term Super ESPC contract.
- The IHS Oklahoma Area is implementing a form of ESPC, without guaranteed savings, for the Creek Nation under a Performance Agreement for Comfort from Trade (PACT) Program. The detailed facility audit identified several energy conservation measures for the Creek Nation Community Hospital in Okemah and three nearby health clinics. Lighting upgrades, two new air-

cooled chillers, three new air handling units, a reduction in kitchen outdoor air quantity, and a new direct disposal control (DDC) system will be installed as a result of this audit.

Utility Partnerships

In FY 1997, the NIH Frederick Cancer Research and Development Center (FCRDC) located in Frederick, MD housed within the DOD Fort Detrick campus partnered with DOD in developing and signing a Basic Order Agreement (BOA) with the local utility (Allegheny Power). Implementation of the energy conservation measures began in FY 1999. The total cost of the targeted projects is \$2.3 million with a total savings of \$3.2 million and a payback of 10 years.

NIH is also analyzing the use of a GSA Area Wide Public Utilities contract with PEPCO Services to perform energy audits and evaluate the energy conservation opportunities at buildings on its main campus. The National Library of Medicine is the first building to receive a comprehensive audit and a feasibility study on the identified energy conservation measures (ECM). Contractual negotiations are underway to implement the ECMs.

NIH has also established an electricity curtailment program with PEPCO at a leased facility in Rockville, Maryland, and funded the installation of emergency generators using natural gas instead of fuel oil. These generators are used as peak shaving devices by generating electric power during PEPCO peak use curtailment periods resulting in annual savings of \$18,000.

CDC in Atlanta, Georgia, has signed a GSA Area Wide with Georgia Power to perform energy efficient lighting upgrades at the Clifton Road Facility.

FDA is involved in three separate utility partnerships:

- The Winchester Engineering and Analytical Center in Winchester (WEAC) Massachusetts, financed a lighting replacement project through the local utility. The project was completed in January 1999, with estimated savings of approximately \$10,000 (a payback of roughly three years).
- The National Center for Toxicological Research (NCTR) in Jefferson, Arkansas, has entered into GSA Area Wide with the local utility company to complete several comprehensive energy projects including energy efficient lighting, building envelop improvements, HVAC upgrades, cooling plant improvement, energy management control

system replacement, and electricity and natural gas procurement. This contract will save an estimated one million dollars per year and reduce energy usage by approximately 25 percent.

- FDA contracts is currently reviewing ESPC with PEPCO Services for the Module One facility in Laurel, Maryland. This ESPC vehicle will cover projects such as chiller replacement and HVAC equipment and systems upgrades and is anticipated to be signed in FY 2000.

PSC has entered into a GSA Area Wide Public Utilities Contract with PEPCO Services at its Parklawn Building, in Rockville, Maryland. Two projects were selected for implementation in FY 1999 under this contract. The first project was a large lighting upgrade which replaced 26,200 fluorescent light fixtures with energy efficient T-8 fixtures and electronic ballasts. An additional 322 incandescent down lights were retrofitted with compact fluorescent kits. This project is expected to save \$211,000 annually and received a \$138,000 utility rebate. The second project involves the replacement of 360 toilets with water saving models, which will decrease annual water and sewer costs by \$58,000 and save roughly 6.3 million gallons of water each year. PSC reports the economic payback of these projects, including rebates, is approximately five years.

The Office of the Secretary is investigating a GSA Area Wide Public Utilities contract with Washington Gas Energy Services to implement a lighting project that involves both delamping and retrofits. The contract is targeted for signing in late FY 2000.

The PSC Parklawn Building purchased deregulated gas in FY 1998 from Washington Gas Energy Services, saving around \$17,000 for the year. The facility remained with Washington Gas in FY 1999, and in FY 2000 will investigate the procurement of natural gas through DOD's Defense Energy Service Center.

The IHS Oklahoma Area also signed a contract in FY 1998 to purchase deregulated natural gas. In FY 1999, annual savings totaled only \$3,400 due to a mild winter and rate bidding issues. Estimated annual savings, under standard conditions, should approach \$16,000.

Procurement of Energy Efficient Products

HHS contracts offices follow the guidelines as established in the Code of Federal Regulations when purchasing energy efficient equipment. OPDIVs have established separate procedures that address recycling paper, motor oils, fly-ash content in concrete materials, operations and maintenance products, ENERGY STAR®

computers, and many other products. When possible, HVAC equipment is purchased with the highest efficiency ratings to take advantage of utility rebates and is selected and sized near peak efficiency points. The handbook from the Federal Procurement Challenge that provided information on how to buy energy efficient products has been distributed to all HHS facility managers.

The OS procurement office is analyzing a model purchasing and procurement policy developed by DOE FEMP. In FY 2000, the policy will be reviewed and tailored for all HHS OPDIVs in order to meet Executive Order 3123 requirements on energy efficient products and services.

At the IHS Billings Service Area, new energy efficient products are reviewed by the Facilities Management Branch engineers using the "SweetSource" product information catalog. These computerized CD catalogs are updated and provided on a quarterly basis by the contracted vendor. The IHS Bemidji, Portland, and Tucson Service Area have written guidelines and specifications on the procurement of energy efficient equipment.

Environmental Benefits of Energy Management

Facilities in each HHS OPDIV have completed, planned, or are in the process of chiller replacement. New non-CFC chillers have been installed that not only adhere to the Clean Air Act Amendment of 1990 and the Clinton Climate Change Action Plan, but operate at increased efficiency, thereby saving energy. HHS facilities have also instituted CFC reduction programs for other HVAC equipment.

Lighting retrofit and upgrade projects in CDC, FDA, IHS, and PSC facilities resulted in the disposition of obsolete bulbs and ballasts in accordance with local Hazardous Waste Management codes and CERCLA (Comprehensive Environmental Response, Compensation and Liability Act). In some cases, the fluorescent light tubes were recycled. Estimates show that the PSC lighting project will eliminate 367 metric tons of carbon emissions.

The CDC water conservation project completed in FY 1998, is saving approximately 15 million gallons of water per year. This project involved the installation of a recirculating cooling tower to provide chilled water to HVAC water source cooling equipment. The system previously used cold chiller water that was dumped down the sewer drain after only one pass through the equipment.

The use of a thermal groundwater-source heat pump, closed-loop system for heating and cooling at the Albuquerque IHS hospital eliminated the need for natural gas boilers and centrifugal chillers, thus reducing the emissions of the boiler and chiller operation. A groundwater-source cooling system is also targeted for implementation in FY 2000 at an IHS hospital in Anchorage, Alaska. The project proposes to use groundwater from a drilled well adjacent to the energy plant, through a heat exchanger to provide chilled water, thereby eliminating the use of three 335-ton rotary screw chillers. Significant energy consumption and carbon emission reductions are expected.

The NIH Main Campus has made significant strides in reducing overall source emissions by converting the central boilers from petroleum-based fuel to natural gas and upgrading the control and burner systems for more efficient operation. From 1992 to 1996, the power plant's total boiler emissions were reduced from 866 to 144 tons (83 percent reduction). This includes reductions of nitrous oxide (NO_x) from 252 tons to 105 tons over the same period through the installation of low-NO_x burners on existing boilers. These emission reductions are being used as offsets against anticipated emissions from a proposed 23-megawatt cogeneration system for which the State of Maryland has issued an Air Quality Permit to Construct.

Energy Management Contact

Mr. Scott Waldman
HHS Energy Officer
U.S. Department of Health and Human Services
Room 709D
Hubert H. Humphrey Building
200 Independence Avenue, SW
Washington, DC 20201
Phone: 202-619-0719
Fax: 202-619-2692

6. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Housing and Urban Development reported a decrease in energy consumption in buildings of 9.1 percent in Btu per gross square foot compared to FY 1985.

HUD Performance Toward Buildings Energy Reduction Goals



HUD Buildings Energy Use and Costs, FY99

	BBtu	\$(Thou.)
Electricity	84.8	1,814.2
Natural Gas	0.3	2.7
Purchased Steam	21.2	317.5
Total	106.3	2,134.4

In order to meet the goal of 20 percent reduction per square foot by the year 2000 as required by the National Energy Conservation Policy Act, Section 543 (a), HUD plans to implement the following energy conservation measures (ECM's) during FY 2000:

- Lighting retrofit throughout building. Change T-12, 34 watt with magnetic ballast fluorescent lights with T-8, 32 watt lights with reflector and electronic ballast.
- Replace original exiting cafeteria steam dishwasher, two hot top ranges, and one griddle top range with an energy efficient dishwasher, two open burner skeleton ranges, and a char broiler.

HUD follows the operations and maintenance (O&M) procedures as outlined in GSA's Building Maintenance Management Handbook and Energy Management Handbook. These handbooks are used to implement the rules and regulations for Federal Energy Property Management. In addition, updated

written guidelines are issued to the O&M contractor annually to ensure operating procedures for heating, ventilation and air conditioning (HVAC) coincide with newly implemented energy initiatives.

The HUD Headquarters Building currently uses FEDS software to perform energy audits when analyzing energy data to develop appropriate and cost effective energy conservation projects and initiatives. Highest priority is given to the energy conservation measures which show the quickest payback (10 years or less) and/or energy savings.

Solar and Other Renewable Energy

The HUD Headquarters Building currently has no clear and renewable energy projects, however, HUD Headquarters plans to participate in these types of energy initiatives through DOE as they are available.

Showcase Facilities

The HUD Headquarters Building is a DOE Government Showcase Facility. An audit will be performed during FY 2000 to incorporate advanced technologies and practices for energy efficiency, water conservation, and solar and other renewable energy sources.

Personnel Development

HUD's energy coordinators have attended the ESPC workshop given through the DOE Federal Energy Management Program.

Three HUD employees continue to be recognized for their contributions for energy management programs through the Federal Energy Management Program (FEMP) "Y ou Have the Power" campaign.

Funding

Funding for HUD's ECMs has been provided by the GSA Energy Conservation Program, by DOE, and through HUD's repair and alteration funds as they are available.

Energy Savings Performance Contracts

HUD tried to enter into two ESPCs in the past. The first ESPC was canceled in FY 1991 when GSA decided to incorporate a lighting retrofit as part of the building wide Sprinkler Installation Project. The second ESPC was canceled in FY 1996 when GSA replaced HUD's main chillers as part of the chlorofluorocarbon (CFC) reduction program.

Utility Partnerships

During FY 1999, PEPCO and Washington Gas, two local utilities performed energy audits at the Headquarters building. The two energy conservation measures (total cost, \$1.1 million) scheduled for FY 2000 were identified in these audits and will be implemented using the GSA Public Utilities Area Wide Contract.

HUD also implements a self imposed load curtailment program and participates in PEPCO's Load Curtailment Program in order to maintain building demand at a predetermined level.

HUD will be contracting the local water utility to perform a water audit during FY 2000.

Procurement of Energy Efficient Products

The products purchased during FY 1999 were in compliance with all Federal recommendation regarding energy efficiency and were covered by the EPA/DOE ENERGY STAR® program.

Environmental Benefits of Energy Management

HUD Headquarters has implemented several environmentally friendly energy conservation measures which include the following:

- HUD currently recycles plastic, glass, paper, cardboard, and polystyrene.
- Replaced existing CFC chillers with non-CFC energy efficient chillers.
- Installed thermostatic controls on perimeter fan coil units throughout the building to maintain temperature standards in exterior offices.
- Installed solar film on 1,584 exterior windows to limit ultraviolet rays and for better control of interior temperatures.

Energy Management Contact

Mr. Michael T. Zelaska
Director, Building Operations Division
Department of Housing and Urban Development
Room 5180
451 7th Street, SW
Washington, DC 20410-3000
Phone: 202-708-2711 x227
Fax: 202-708-0299

7. DEPARTMENT OF THE INTERIOR

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Interior Department reported a decrease in energy consumption in buildings of 15.7 percent in Btu per gross square foot compared to FY 1985.

Interior Performance Toward Buildings Energy Reduction Goals



Interior Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	1,546.4	35,605.3
Fuel Oil	486.6	2,508.6
Natural Gas	1,352.3	4,863.0
Propane	348.5	2,390.7
Coal	0.7	0.4
Purchased Steam	31.6	470.1
Other	28.5	149.0
Total	3,794.6	45,987.1

The Interior Department Energy Management Plan for Buildings and Facilities, revised in June 1995 to meet requirements of EPACT and Executive Order 12902, provides guidance to its Bureaus in establishing and implementing energy management programs.

In FY 1999, the Department established a renewed emphasis on energy management through an Interior Management Leadership Program (EML). The Departmental Energy Conservation Committee developed recommendations for implementing energy efficiency and green energy-saving technology initiatives Department-wide.

The Bureau of Reclamation continued in FY 1999 to evaluate prioritization surveys to determine facilities for comprehensive audits. Energy conservation projects in Reclamation are usually financed via the operations and

maintenance funds identified for energy conservation as a working capital fund.

The Fish and Wildlife Service (FWS) nominated 27 sites for energy audits utilizing the SAVEnergy Audit program conducted through DOE's Federal Energy Management Program (FEMP). Through FY 1999, six of 27 nominated surveys were completed.

The U.S. Geological Survey accomplished preliminary audits at the Powell Building in Reston, Virginia and condition assessments at the Patuxent Wildlife Research Center, Maryland. A comprehensive audit has been completed for the EROS Data Center in South Dakota.

The National Park Service (NPS) formed an 'energy partnership' with James Madison University (JMU). The program enlisted students from JMU's Integrated Science and Technology Program to work with NPS engineers. Projects included energy surveys, developing an innovative database to track energy consumption and costs, and identification of a renewable energy project.

In April 1999, a memorandum of understanding was signed between DOE and the Department to further solidify the partnership between NPS and DOE. This new program is called the "Green Energy Parks Program: Making the National Parks a Showcase for a Sustainable Energy Future (GEPP)." The program promotes the use of energy efficient and renewable energy technologies and practices in the National Parks, and educates the visiting public about the cost and environmental benefits of energy improvements.

Preliminary audits were conducted in the Main Interior Complex which identified lighting opportunities. Other bureaus also reported using the FEDS Level II software to perform energy audits.

The following energy and water conservation audits and initiatives were under way or completed during FY 1999:

Bureau of Reclamation:

- Xeriscaping was used at the newly constructed Centennial Job Corp Center in Nampa, Idaho.
- The Hungry Horse Field Office, Montana continued to retrofit their lighting system.
- New insulation, siding, double pane windows, and new doors were installed in the crew quarters at

Jackson Lake Dam, Wyoming.

- The Folsom Dam, California HVAC system was upgraded.
- Energy-efficient water heaters were installed at the Lake Berryessa dormitory. Also, a non-operational solar hot water system was evaluated for use.
- A lighting retrofit at two facilities in Boulder City, Nevada.
- The heating and cooling system at Carl Hayden Visitors Center has been replaced. The system is saving approximately 31,000 kilowatt-hours and \$24,000 per month during the cooling season and 20,000 kilowatt-hours and \$1,600 during the heating season.

Fish and Wildlife Service:

- The Mora National Fish Hatchery and Technology Center of the Southwestern Fisheries Technology Center in New Mexico has incorporated extensive water reuse into the design of the hatchery.

U.S. Geological Survey:

- At the John Wesley Powell Federal Building in Reston, VA, maintenance on existing equipment and systems was completed to maintain peak operating efficiency. The building automation system is utilized to operate systems in accordance with the building operating plan, reducing equipment run times, adjusting space temperatures, and shedding loads during peak periods.
- Projects to be completed at the EROS Data Center, Sioux Falls, South Dakota during FY 2000 include the replacement of an uninterruptible power supply and a lighting retrofit. Estimated annual savings are \$37,800.
- Various Biological Resources Division Science and Research Centers have undertaken to install several energy conservation measures including lighting retrofits, HVAC system upgrades, new fume hoods, boiler and chiller replacements, and installation of energy-efficient office equipment.

Bureau of Land Management:

- The Administrative Office Building for the Alaska Fire Service upgraded its insulation, replaced its roof, and conducted a lighting and HVAC retrofit.

- The Northern Field Office in Fairbanks, Alaska conducted a lighting retrofit and replaced the roof and insulation.
- Little Sahara and Fillmore Fire stations in Utah had a lighting retrofit and low-e windows installed.
- The Fillmore, Utah Field Office replaced a HVAC roof-mounted unit. Both the Lower Snake River District Office in Idaho and the Roseburg, Oregon District Office also upgraded their HVAC systems.
- The Colorado State Office installed a natural gas heating system and tinted window coverings.
- The Saguache Field Office improved insulation and air flow.

Solar and Other Renewable Energy

The Department has become a leader in ground source heat pumps, with seven projects installed since 1994, including the \$11 million, 42,000 square foot Prairie Learning Center in Prairie City, Iowa, and the \$6.3 million, 22,000 square foot Visitor Center in the Wichita Mountains Wildlife Refuge, Oklahoma.

The NPS uses an innovative strategy to augment funding for a number of photovoltaic projects. Photovoltaic installations are used as training sessions to provide participants with hands-on training including site selection, assembly, battery connections and wiring, and maintenance. Training fees are used to subsidize the project cost. In FY 1999, this strategy was used to install photovoltaics at Horn Island, Gulf Shore National Seashore.

During FY 1999 photovoltaic projects were installed at the following 13 NPS sites:

- Grand Canyon National Park, Arizona;
- Alcatraz Island National Historic Site, California;
- Gulf Islands National Seashore, Florida;
- Hawaii Volcanoes National Park, Hawaii;
- Indiana Dunes National Lakeshore, Indiana;
- Isle Royale National Park, Michigan;
- Cape Lookout National Seashore, North Carolina;
- Round Top Mountain at Dinosaur National Monument, Utah;
- Rainbow Point, Bryce National Park, Utah;
- Manti-LaSal National Forest, Utah;
- Zion National Park, Utah;
- Lake Roosevelt National Recreation Area, Washington; and,
- USS Arizona visitor's site parking lot.

These projects included photovoltaic powered lights, trailer-mounted systems, power systems, and solar water heating systems.

During FY 1999, the Bureau of Indian Affairs installed several renewable energy systems:

- The Sherman Indian School in Riverside, California installed a new photovoltaic system that can supply 30 kilowatts of power and will be connected to the power distribution grid. The project will also be used as an educational and training resource.
- The Truxton Canyon Agency installed three photovoltaic systems at facilities in Supai, Arizona, on the Havasupai Indian Reservation. Power will be provided to the school, jail, and government housing. This will also be used for training.
- The Seba Dalkai school in Arizona installed a building-integrated photovoltaic system to help prevent blackouts and brownouts in the school's computer-based curriculum.
- The Fort Apache Agency installed five wind turbines in Arizona to provide reliable power for fire lookout towers in the White Mountains.

The Bureau of Reclamation's Mid-Pacific Region installed grid tied solar panels at the Water Education Center, Folsom, CA. Financial incentives and other services provided by utilities are utilized whenever possible to promote the use of renewables. For example, Sacramento Municipal Utility District and the Western Area Power Administration subsidized the cost of the solar panels installation at the Education Center and the donation of two electric buses from Sacramento County. Reclamation is also installing a solar lighting system for outdoor lights at Davis Dam, Arizona.

Reclamation, as the nation's sixth largest producer of hydroelectric power, is committed to provide hydro power in a cost effective manner and to protect the water resources necessary to produce this power.

In FY 1999 the Bureau of Land Management completed 11 photovoltaic projects. Six were for facility power, four for water pumping projects, and one for lighting.

The U.S. Geological Survey has installed 11 solar powered emergency telephones in parking lots in Reston, Virginia.

The Fish and Wildlife Service (FWS) installed several renewable projects during FY 1999:

- The Alchesay National Fish Hatchery in Arizona repaired a solar-powered early warning system. This system provides notice to downstream facilities of an impending flood.
- The Farallon National Wildlife Refuge in California completed a photovoltaic system which converted the diesel generator system to a 6.84 kilowatt photovoltaic system with generator back-up. Fuel usage fell from 5,000 gallons per year to 600 gallons. Operations and maintenance savings are estimated at \$82,000 annually. Annual energy savings are estimated at 61 million Btu.
- The Cusano Environmental Education Center installed a geothermal heat pump.
- The John Heinz National Wildlife Refuge in Pennsylvania included a geothermal system in the design of a new education/headquarters building.
- The Madison Wetland Management District in South Dakota replaced an existing solar system and heat pumps with a geothermal heat pump system.
- Five wind energy projects have been constructed at National Wildlife Refuges in Brazoria and Hagerman, Texas, Harris Neck, Georgia, Maxwell, New Mexico, and Hawaii. These are not currently operational due to high maintenance costs.

Proposed FWS renewable projects for FY 2000 include a photovoltaic power system at the Havasu National Wildlife Refuge in Arizona and a solar hot water system at the Imperial National Wildlife Refuge also in Arizona.

The Department continues to work with DOE and the Corporation for Solar Technology and Renewable Resources (CSTRR) on the purchase of 'green' electricity.

Showcase Facilities

The Department designated the National Conservation Training Center (NCTC) in West Virginia as a new construction energy saver showcase. Passive solar energy strategies and energy-efficient technologies and recycled materials were incorporated in the design and construction.

Two FWS buildings were recognized as showcases in 1998. The Wichita Mountains Visitor Center in Indianola, Oklahoma displays earth coupled heat pumps. The Prairie Learning Center in Prairie City, Iowa displays earth coupled heat pumps along with earth sheltering, celestory lighting, low-flow plumbing

and wetlands waste water treatment.

Reclamation has four showcase facilities. Glen Canyon Dam Visitor's Center demonstrates energy conservation within a hydroelectric generating facility. Lighting retrofits and occupancy sensors are being installed throughout the facility. Toilets were replaced with low-flush units, single pane windows with insulated glass, and the existing solar hot water heating system was repaired.

The Denver Federal Center showcase facility is a joint effort between Reclamation, GSA, DOE, EPA, the local water utility, and four manufacturers of water-saving devices. This 2-year project demonstrates and evaluates water conservation technologies and provides a learning center for other Federal agencies, private organizations, and the general public. The project will also document the performance of water conservation devices, determine life-cycle cost savings, and determine if improvements are needed before deployment in the Federal sector. An irrigation control system was also installed, and a xeriscape garden has been planted.

Reclamation's Pacific Northwest Region showcase facility is the new Centennial Job Corps Center in Nampa, Idaho. A dedication ceremony for the new center was held in October 1997. Included at the October dedication ceremony was an exhibit that featured the energy-efficient and water-conservation technologies.

The Davis Dam Building in Bullhead City, Arizona, highlights lighting and electric savings opportunities.

NPS's showcase is the Golden Gate Club at Golden Gate National Recreation Area in California. The U.S. Geological Survey's EROS Data Center's Mundt Building in South Dakota exhibits mechanical upgrades. No new showcases were identified in FY 1999.

Personnel Development

Several bureaus have developed energy management workbooks and training packages covering the various energy-efficiency and renewable energy technologies. These are helpful in raising awareness and providing educational opportunities for employees and have resulted in the sharing of ideas and promotion of energy conservation management.

Energy managers involved in building energy efficiency and water conservation have attended workshops offered by DOE's Federal Energy Management Program. Several have also attended training offered by other organizations such as GSA, EPA, the Association

of Energy Engineers, public utilities, and Bureau energy coordinators meetings. Energy managers are encouraged to attend as much training as local funding will allow.

Both the NPS and the FWS were recognized for excellence in the area of renewable energy at the 1999 Federal Energy and Water Management Awards.

Funding

The Department funded \$1.73 million in retrofit and capital equipment for FY 1999. Estimated project funding for FY 2000 is \$900,000 and \$700,000 for FY 2001. As in previous years, the Department funding for retrofit and capital improvements result from expenditures from the Bureaus' operations, maintenance, construction, and rehabilitation funds.

During FY 1999, NPS committed the following to support the Green Energy Parks program: \$500,000 to fund the planning and implementation of sustainable energy parks in 20 parks around the country, and \$75,000 to jointly fund with FEMP a university-based audit program that will conduct audits in 14 parks by September 30, 2000.

DOE committed nearly \$1 million in FY 1999 to the Green Energy Parks program. The Clean Cities and Regional Biomass programs contributed \$500,000 to fund acquisition of alternative fuel vehicles. FEMP contributed \$100,000 to fund energy projects, and \$75,000 to the university audit program. FEMP also provided a minimum of \$150,000 in technical assistance to for the implementation of energy projects.

In FY 1999, the National Renewable Energy Laboratory provided \$35,000 in funding for renewable energy opportunity assessments on 20 FWS field stations. The assessments will be made using the Federal Renewable Energy Screening Assistant software and other analysis methods.

The Fish and Wildlife Service also applied for FEMP Renewable Energy Project Funding for two projects (a 10 kilowatt wind generator at Erie National Wildlife Refuge in Pennsylvania and a 40 kilowatt wind generator in Prime Hook National Wildlife Refuge in Delaware) in FY 1999. The projects were not selected for funding.

Energy Savings Performance Contracts

ESPCs currently in place are lighting projects at the National Park Service's Statue of Liberty and Ellis Island National Monument, and three Bureau of Reclamation sites including Weber Basin Job Corp Center, Colbran Job Corp Center, and the Provo Area

Office.

The use of the indefinite delivery, indefinite quantity contracts developed by NPS in conjunction with DOE is expected to increase familiarization with ESPCs and hopefully increase the number of ESPCs in the Department.

Presently, at the Lake Mead National Recreational Center in Nevada, NPS is exploring the possibility of building five park entrance stations that would be powered by photovoltaics and heated by ground source heat pumps. NPS is very interested in using DOE's technology-specific, photovoltaic Super ESPC to complete this project.

Utility Partnerships

NPS and the Pacific Gas and Electric Company negotiated an innovative demand side management contract that pays NPS for energy saved. Now in its fifth year, savings are approaching \$1 million.

Each Reclamation office is encouraged to periodically check with their utility to determine if any incentives are being offered.

The U.S. Geological Survey, as an ongoing part of their energy and water management program, consults with servicing utilities at least annually to ensure that each facility has the lowest possible rate schedule. Utilities are consulted about incentive and rebate opportunities. High energy-use systems are scheduled to take advantage of off-peak rates.

Fish and Wildlife Service field stations also maintain contact with their local utilities in order to obtain any available demand-side management services.

Procurement of Energy Efficient Products

The Department is currently making every effort within budgetary limitations to implement applicable rules and regulations regarding procurement of energy-efficient goods and services.

Alternative Fuel Vehicles

The Bureau of Land Management introduced a fleet of 75 bicycles that are used in lieu of motor vehicles at Fort Wainwright, Alaska. The bicycles save thousands of dollars in fuel and maintenance, and provide exercise for employees. At other bureau sites, the use of mass transit and car pooling is encouraged, and a proposal to reduce fuel consumption was presented to bureau Deputy State Directors for Administration.

During FY 1999, NPS established a several initiatives in partnership with the Department of Transportation,

including:

- Grand Canyon National Park; natural gas and electric transit vehicles, bike trails, and a fixed rail system.
- Zion National Park; propane buses.
- Yosemite National Park; two electric buses with plans for a multi-modal system.
- Golden Gate National Recreation Area currently has an electric tram and is pursuing a multi-modal system including water-based transit.
- Cape Cod National Seashore acquired two hybrid electric buses to replace aging vehicles.

Environmental Benefits of Energy Management

Environmental and energy education efforts are being implemented on a daily basis and include information about energy and water conservation needs, purchase of energy-efficient equipment, replacing lighting and plumbing fixtures with energy/water efficient equipment, and entering into demonstration projects and partnerships with others.

At the request of the Department of the Interior's Management Council, a task force of bureau energy managers was convened to develop recommendations for implementing energy efficiency and green energy-saving technology initiatives Department-wide. The recommendations help provide energy management leadership and will be incorporated into the Departmental Energy Management and Water Conservation Plan for Buildings and Facilities.

Energy Management Contact

Mr. John Moresko
Property Management Specialist
Office of Acquisition and Property Management
U.S. Department of the Interior
Main Interior Building, Room 5512
1849 C Street, NW
Washington, DC 20240
Phone: 202-208-5704
Fax: 202-208-6301

8. DEPARTMENT OF JUSTICE (DOJ)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Justice reported a decrease in energy consumption in buildings of 40.5 percent in Btu per gross square foot compared to FY 1985.

Justice Performance Toward Buildings Energy Reduction Goals



Justice Buildings Energy Use and Costs, FY99

	BBtu	\$(Thou.)
Electricity	3,224.1	53,471.5
Fuel Oil	104.4	639.8
Natural Gas	4,393.4	19,681.3
Propane	10.6	4.5
Coal	62.9	123.0
Purchased Steam	249.6	2,734.7
Other	2.0	0.0
Total	8,047.0	76,654.8

The Bureau of Prisons (BOP) funded and completed six energy audits in FY 1999, bringing its total number of completed audits to 70. An additional four audits will be funded in FY 2000. The remaining institutions which have not been surveyed are primarily institutions that have been activated within the past five years and already include energy conservation design features.

The following energy and water conservation audits and initiatives were under way or completed during FY 1999:

Bureau of Prisons:

- Federal Correctional Institution (FCI) Sandstone, Minnesota. This project entails the installation of an energy management system. Projected annual energy savings are in excess of 48 billion Btu with

the expected payback of the initial investment projected to be in the second year of operation.

- United States Medical Facility for Federal Prisoners, Springfield, Missouri. Project elements include the replacement of an air conditioning unit with an energy-efficient model, and a lighting retrofit. Projected annual savings in electrical consumption are estimated at 400,000 kilowatt-hours with an associated cost savings of more than \$15,000. Simple payback is expected to occur in four years.
- FCI Florence, Colorado. Lighting controls were installed and are expected to reduce electrical consumption by over 1 million kilowatt-hours per year, with associated electrical charges expected to decrease by approximately \$45,000 annually. Payback is expected in year two. Also at FCI Florence, water saving devices for showers and faucets were installed. Natural gas consumption will decrease by more than 96,000 terms annually, with attributable annual cost savings of more than \$18,000. Savings from the decrease in water consumption are estimated to be in excess of \$290,000 per year. Payback will occur in one year.
- FCI Englewood, Colorado. A lighting retro fit will produce estimated annual savings of more than 740,000 kilowatt-hours and \$37,000. Simple payback will occur in the sixth year.
- United States Penitentiary (USP), Leavenworth, Kansas. New HID high mast lights were installed with projected energy savings of more than 200,000 kilowatt-hours and \$17,000 per year. Simple payback will occur in year five.
- Federal Detention Center, Miami, Florida. A lighting retrofit will produce estimated annual savings of more than 300,000 kilowatt-hours and \$20,000. Simple payback will occur in year five.
- FCI Seagoville, Texas. A lighting retrofit will produce estimated annual savings of more than 640,000 kilowatt-hours and \$25,000. Simple payback will occur in year three.
- Metropolitan Detention Center, New York, New York. A lighting retrofit will produce estimated annual savings of more than 75,000 kilowatt-hours and \$8,000. Simple payback will occur in year seven.
- FCI Allenwood, Pennsylvania. A lighting retrofit

and the replacement of exit signs with LED signs will produce estimated annual savings of more than 125,000 kilowatt-hours and \$9,000. Simple payback will occur in year ten.

- USP Marion, Illinois. Energy-efficient windows were installed with annual energy savings in excess of nine tons of coal. Payback will occur in year eight.
- Federal Prison Camp, Yankton, South Dakota. A HVAC system upgrade and improvements to the energy management system will produce estimated annual savings of more than 54,000 kilowatt-hours with an annual reduction in utility charges and maintenance. Payback will occur in year 11.

Federal Bureau of Investigation (FBI):

- In addition to the \$1.8 million energy management system contract to be awarded in FY 2000, the FBI is implementing additional energy conservation projects at FBI Headquarters in Washington, DC. These include installing new high-efficiency lighting in garages, installing high-efficiency motors and variable-speed drives for pumps, and the installation of a new air handler with a high efficiency motor for the gymnasium. An energy conservation program was also installed to centrally shut off perimeter office lighting during non-office hours.
- Equipment at the FBI Academy in Quantico, Virginia that used number 2 fuel oil is being converted to natural gas. Also, chillers are being replaced with more efficient units.
- The Strategic Information and Operation Center at FBI Headquarters has been designed and constructed using variable frequency drives on chilled water pumps, high efficiency compressors and dimmable electronic ballasts.

Six new energy-efficient refrigerated rooms are planned to replace existing equipment at the FBI Headquarters cafeteria, and new, more efficient, escalator motors are to be installed in 2004. Funding has been requested for replacement of the original Headquarters elevator generators in FY 2000.

Drug Enforcement Administration (DEA):

- DEA is conducting a lighting retrofit at its Headquarters facility that should be completed during FY 2000.
- 320 500-watt sodium vapor lamps have been

replaced with eight-foot, energy-efficient, high lumen output fluorescent fixtures in the DEA garage facility. The new fixtures have been placed on timers that activate every third fixture from 6:00 PM to 6:00 AM daily instead of lighting the entire garage 365 days per year, 24 hours each day.

Solar and Other Renewable Energy

The BOP ESPC discussed below utilizes solar power to provide hot domestic water to a prison in Arizona.

The FBI will include renewable energy sources in future designs wherever feasible. So far, budget constraints have prevented the use of active solar or other renewable technologies in new FBI construction projects, but passive solar design has been incorporated. The FBI has identified sites that would be cost-effective for active solar energy retrofits.

Showcase Facilities

INS will attempt to showcase three facilities in FY 2000:

- The Batavia, New York Federal Detention Facility was completed in FY 1999; its design incorporates energy-efficient materials and equipment, and the facility has entered into a national fuels contract to purchase natural gas at less than market price, saving thousands of dollars annually. Electric power is supplied by an INS-owned transformer rather than the local utility, saving more than \$60,000 annually.
- The Krome Service Processing Center in South Florida is being designed with energy-efficient materials and equipment, including solar technologies.
- A Border Patrol Station in Remey, Puerto Rico is being designed with the use of energy-efficient materials and equipment, including solar power backup.

DOJ will establish a goal of designating at least one facility from each of its bureaus in FY 2000 as a showcase facility.

Personnel Development

DOJ periodically conducts meetings with its Bureaus to disseminate information and provide guidance and assistance. In FY 1999, DOJ made arrangements with DOE representatives to present alternative energy strategies and methods of funding to the major Bureaus.

Energy conservation has been a topic at the bi-annual Facilities Management training course. The course generally has 25 participants from throughout the Bureau of Prisons. Topics include such items as review of the energy program and required documentation for requesting energy projects. A life-cycle costing workshop has been provided at some of the more recent courses.

Efforts in promoting energy conservation can be recognized in performance evaluations of BOP personnel involved with the energy conservation program. The in-house engineering staff of the FBI is responsible for energy management activities and the position descriptions and performance evaluations for these engineers reflects that proper energy and water conservation methods be used in job performance.

Bureaus will be encouraged to establish separate award programs for energy and water conservation. However, existing employee award programs are sufficiently broad to recognize these types of contributions. Employees are nominated for Federal Energy and Water Management Awards annually.

Funding

Energy conservation projects have been funded in the amount of \$1,529,000 during FY 1999. These projects have an estimated annual energy savings of over 70.7 billion Btu.

Energy Savings Performance Contracts

Operation commenced during FY 1999 on the ESPC at FCI Phoenix in Arizona. Under this ESPC, a solar hot water system has been installed that will provide a large percentage of the domestic hot water for the prison. The ESPC became operational in February 1999; as of June 1999, total savings were \$33,070. Additional savings of \$500 per month result from decreased required maintenance.

Utility Partnerships

The BOP has actively taken part in a number of utility incentives and rebate programs in an effort to reduce the amount of Government funding required to complete energy conservation projects. Both electric and natural gas utilities have worked with BOP by providing services, guidance, and financial incentives on lighting and HVAC system improvements. The Drug Enforcement Agency (DEA) will also be addressing these issues with Virginia Power as part of its energy audit procedure.

The FBI Headquarters and the Main Justice Building participate in the PEPCO energy curtailment program during peak cooling periods in the summer months.

Procurement of Energy Efficient Products

The BOP's policy requires the selection of energy-consuming equipment be made on the basis of life cycle cost analysis.

Alternative Fuel Vehicles

DOJ's Justice Management Division (JMD) is currently working with a major automobile manufacturer to acquire two compressed natural gas (CNG) sedans and an electric pickup truck to support the motor pool in Washington, DC.

The BOP is in the process of locating compressed natural gas vehicles at several of their prison facilities. CNG refueling pumps and vehicles have been funded and currently are on order.

The U.S. Marshals Service purchased seven methanol flex-fuel vehicles when the infrastructure was expected to increase. Since this expectation was not met, it will pursue other types of AFV.

JMD staff is serving on a government-wide committee that has chosen six U.S. cities to create pilot programs that will assist in the development of alternate fuel vehicle (AFV) markets by increasing local infrastructures to support AFV use. In addition, the GSA is sponsoring a similar program in Washington, DC. These cities will be targeted for vehicle placement, fueling infrastructure, and combining with local government fleets to create an AFV market.

Environmental Benefits of Energy Management

BOP and FBI include energy and water conservation criteria in their position descriptions and performance evaluations for relevant staff members.

DOJ encourages its Bureaus to establish separate award programs for energy and water conservation. Employees are also nominated for the annual Federal Energy and Water Management Awards.

Energy Management Contact

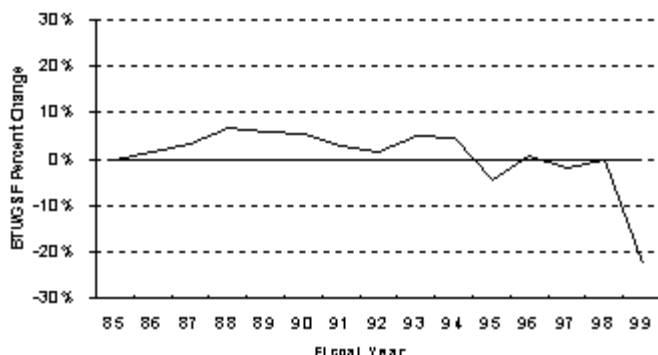
Mr. William Lawrence
Energy Program Manager
U.S. Department of Justice
Main Justice Building, Suite 1050
1331 Pennsylvania Avenue, NW
Washington, DC 20530-0001
Phone: 202-616-2417
Fax: 202-307-1874

9. DEPARTMENT OF LABOR (DOL)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Labor reported a decrease in energy consumption in buildings of 22.5 percent in Btu per gross square foot compared to FY 1985.

Labor Performance Toward Buildings Energy Reduction Goals



DOL Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	630.0	12,092.8
Fuel Oil	159.0	535.7
Natural Gas	856.7	4,419.0
Propane	29.9	191.2
Purchased Steam	22.3	333.8
Total	1,697.9	17,572.5

DOL's steep decline in Btu/GSF during FY 1999 is partially attributable to incomplete reporting. Labor reported consumption in only 2.0 million square feet of buildings space in FY 1999. This is compared to 18.6 million square feet in FY 1998. While not all data was reported during FY 1999, DOL's building inventory remains at approximately 19 million square feet.

In compliance with the Executive Order 13123, Job Corps Program has developed a strategic plan to fulfill the requirements of this order and to reduce energy consumption in all its facilities using a combination of energy savings performance contracts (ESPCs), area-wide utility contracts, and direct agency funding. In addition, many Job Corps Centers (JCCs) have developed a no-cost/low cost energy conservation program to reduce the facility energy consumption.

Facility energy audits finalized during FY 1999 included Gary, IN; Pittsburgh, PA; Kittrell, NC; Inland Empire, CA; and Sacramento, CA Job Corps Centers.

Building envelope improvements, HVAC and electrical system upgrades, lighting retrofits, and water conservation efforts have been implemented at the following JCCs during FY 1999:

- Albuquerque,
- Clearfield,
- Delaware Valley;
- Guthrie,
- Kicking Horse,
- Kittrell,
- Penobscot,
- Ramey;
- Tongue Point,
- Tulsa, and
- Turner.

Future projects under consideration include:

- Conduct EPA Green Lights Program. This program is designed to promote energy efficiency by implementing cost effective programs to maintain or improve the quality of safety of the workplace.
- Conduct a survey and monitor energy use each week for three months. The survey will provide a source of energy use information, and recommendations for a director of best practices can be identified from survey results.
- Review light practices and recommend proposals for lighting, e.g., if you don't need it, turn it off. There are a significant savings available with improved lighting control. Find out what information is available from the "Watts-On" program from PEPCO.
- Other Projects. Develop a quarterly information exchange bulletin. Conduct annual energy management seminar. Schedule events throughout the year with continuous emphasis applied to the energy management program to educate employees within the organization.

Solar and Other Renewable Energy

San Diego JCC utilizes solar energy for domestic water heating. Plans to upgrade and recommission an existing non-functional solar water heating system at the Gary Job Corps Center are underway as part of ESPC discussed below.

Showcase Facilities

The variation of function among the typically small

buildings of Job Corps facilities limits the choice of suitable candidate buildings. In addition, the limited public exposure of Job Corps buildings further diminishes the potential benefits of showcase construction. As a result, no showcase facilities have been constructed.

Personnel Development

Plans to attend the ESPC, Super ESPC and other energy management workshops are underway for designated energy managers.

Energy Savings Performance Contracts

Job Corps is currently involved with two projects utilizing DOE's Regional Super ESPCs:

- The DOE Central Region selected the Gary JCC as one of two federal facilities to be included in their RFP solicitation. Sempra Energy services, the selected energy services company, has developed a report of all applicable energy conservation measures and financing. The project scope includes lighting upgrades, installation of programmable thermostats, replacement of HVAC equipment in several buildings, water measures, and the refurbishment and decommissioning of a currently non-operational solar hot water heating system. It is anticipated that the Gary delivery order will be signed soon.
- ERI Services has prepared a scope for both the Inland Empire JCC and Sacramento JCC as a bundled ESPC project. The project incorporates lighting upgrades. DOL signed the delivery order and construction should be completed in December 1999.

Utility Partnerships

Job Corps is currently working on two projects which utilize GSA Area-Wide Contracts:

- Kittrell JCC completed negotiations with Carolina Power and Light (CP&L) for an energy conservation project. CP&L has commenced the design/retrofit phases and the lighting retrofit work will be complete by the end of this calendar year.
- Pittsburgh JCC initiated an energy conservation retrofit project with Equitable Gas, the natural gas supplier for the center. The preliminary project proposal submitted by the utility company is currently being reviewed by DOL. It is anticipated that funds to implement this project will be paid up front by DOL as opposed to using a financing option. The proposal includes a center-wide lighting retrofit and modification of the current

natural gas rate schedule.

Job Corps has also taken steps to take advantage of electricity deregulation. An agreement has been made between DOL and GSA, Mid-Atlantic Region to purchase electricity at a competitive rate for Pittsburgh, Keystone, Red Rock and Edison JCCs. Through this agreement, the lowest rates available will be obtained.

Alternative Fuel Vehicles

The DOL vehicle fleet consists of approximately 4,000 GSA Fleet vehicles and 190 agency owned or leased vehicles. In compliance with Executive Order 13031 - Federal Alternative Fueled Vehicle Leadership, the DOL has acquired vehicles in the following categories: ethanol flex fuel, dedicated methanol, compressed natural gas and electric vehicles.

Environmental Benefits of Energy Management

All agencies are required to recycle white paper, newspaper, glass, and aluminum can. Containers have been placed throughout DOL buildings for employees to recycle. Funds from recycling are given to the DOL Child Development Center for tuition subsidies for DOL employees and improvements to the Center.

Contractors that provide goods and services to the DOL are encouraged to use recycled goods and environmentally-preferable products.

The Atlanta Regional Office is partnering with the State of Georgia in support of the Partnership Initiative for a Smog Free Georgia. Several environmental activities which comply with mandates of the Clean Air Act have also been implemented.

As part of an education and awareness program a Recycled Products Fair is being planned. Vendors will be invited to sell environmental preferable products and services, to display their merchandise, and to provide an opportunity for employees to become aware of what types of goods and services are available.

Energy Management Contact

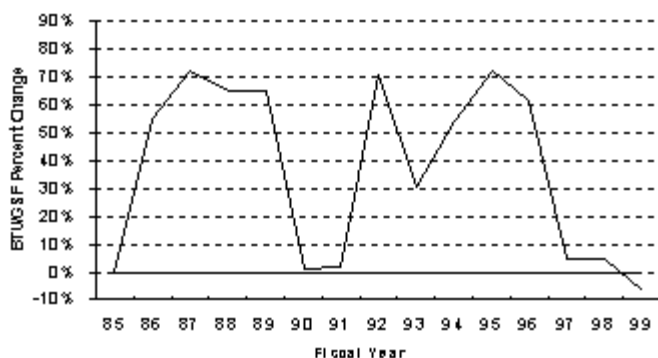
Ms. Patricia C. Clark
Department of Labor Energy Manager
U.S. Department of Labor
200 Constitution Avenue, NW
Washington, DC 20210
Phone: 202-219-5205 X115
FAX: 202-501-6886
E-mail: pcclark@dol.gov

10. DEPARTMENT OF STATE (DOS)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of State reported a decrease in energy consumption in buildings of 7.0 percent in Btu per gross square foot compared to FY 1985.

State Performance Toward Buildings Energy Reduction Goals



State Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	1,553.0	33,243.2
Fuel Oil	1,098.0	3,883.9
Natural Gas	349.0	2,060.2
Purchased Steam	12.3	646.7
Total	3,012.2	39,834.0

The extreme fluctuations in the State Department's Btu/GSF is a result of the inclusion of energy consumption and square footage from the Foreign Buildings Operations for certain years. During FY 1998, the State Department developed a statistical method for estimating the energy consumption of its foreign buildings worldwide and included these estimates in their data for the years 1985, 1990, 1991, 1998, and 1999.

State will continue the energy audit and energy conservation opportunity identification program to pursue maximum energy efficiency of its facilities. To date, all major facilities (over 300,000 square feet) have been audited through comprehensive audit method. As new technologies are developed, re-audits are done to assess applicability for installation. Smaller facilities are audited by walk-through or partial comprehensive method.

State has determined certain technologies should be

installed as a normal course of maintenance where funds are available:

- Energy-efficient motors and variable speed drives;
- T-8 and T-5 electronic lighting;
- Ultrasonic or thermal motion sensors;

The following energy and water conservation audits and initiatives were under way or completed during FY 1999:

- Sensor water faucets and toilets were installed in the Main State building and the National Foreign Affairs Training Center (NFATC) in Arlington, Virginia.
- At the Main State building, steam consumption has been reduced by 22 percent.
- The Main State building implemented a lighting retrofit and installed an energy management system and motion sensors in corridors and public spaces.

GSA is replacing the four main refrigeration machines in the Main State building. GSA also began an extensive renovation of the Main State building during FY 1999. This will entail the replacement of all electrical and mechanical systems; first will be the replacement of chillers. The renovation will be complete in FY 2012.

During FY 1999, comprehensive surveys were performed at the following U.S. Embassies:

- Santiago, Chile;
- Rome, Italy;
- Kingston, Jamaica;
- Tokyo, Japan;
- Kuala Lumpur, Malaysia;
- Managua, Nicaragua;
- Oslo, Norway;
- Riyadh, Saudi Arabia;
- Singapore, Singapore;
- Paramaribo, Surinam; and,
- Montevideo, Uruguay.

Comprehensive surveys were also performed at the following Consulate Generals:

- Hamburg, Germany; and,
- Munich, Germany.

Three rate and metering surveys were performed at:

- U.S. Embassy Port Louis, Mauritius;
- U.S. Embassy Belize City, Belize; and,
- U.S. Consulate General Guayaquil, Ecuador.

Solar and Other Renewable Energy

State has signed a memorandum of understanding with the Geothermal Heat Pump Consortium for application of geothermal technology.

State dedicates 10 percent of foreign building energy conservation measure implementation funding to renewable energy projects. More than 350 solar hot water systems have been installed at State foreign buildings worldwide, including FY 1999 installations of solar hot water systems at residences in Bridgetown, Barbados; Nassau, Bahamas; and Port Louis, Mauritius. Additional FY 1999 renewable energy activities include installation of a 10-kilowatt wind turbine generator at the Port Louis residence, and installation of daylighting in a Jakarta warehouse.

Energy Showcases

State has designated the Florida Regional Center as a Federal solar energy showcase facility, the first technology-specific showcase. A solar audit of the facility will be implemented.

Designs were initiated or ongoing during FY 1999 for a new office building in Tashkent, Uzbekistan, and for housing in Shanghai, China, which are designated showcases. The Chancery Office Building and Deputy Chief of Mission Residence are designated showcases in Port Louis.

Personnel Development

State will include successful implementation of Executive Order 13123 provisions in the position descriptions and performance evaluations of the agency energy team, principal program managers, heads of field offices, facility managers, energy managers, and other appropriate employees.

State will ensure that all appropriate personnel receive training. State is attempting to develop overseas resident energy managers or, at a minimum, to encourage energy awareness through the Overseas Facilities Manager Program. Twenty-one additional FBO staff became trained energy managers through a five-day Association of Energy Engineers course.

Funding

During FY 1999, the Office of Foreign Buildings Operations (FBO) committed \$1.2 million to overseas

posts; this is expected to yield annual energy cost savings of \$230,000. In addition, \$347,000 has been committed to support energy efficiency improvements in future construction projects. This is expected to yield an additional \$35,000 annual saving.

Energy Savings Performance Contracts

FBO has one ongoing ESPC at the U.S. Embassy in Mexico City. Cumulative cost and energy savings over the nine year contract term will be \$603,000 and 6.6 million kilowatt-hours.

FBO has also negotiated two additional international ESPC efforts, with the local host governments and utilities, to install natural gas fuel cell power plants at U.S. Embassy Tokyo, Japan, and U.S. Consulate General Frankfurt, Germany. These unique contracts form international energy partnerships among the U.S. foreign mission, the host local government, an American energy service company, and often the local utility. Delivery orders are expected in the first quarter of FY 2000.

Utility Partnerships

State has attempted to enter into one utility energy efficiency service agreement.

FBO will continue to work with local utilities to develop energy efficiency strategies.

Procurement of Energy Efficient Products

State will select, where life-cycle cost-effective, ENERGY STAR® and other energy efficient products when acquiring energy-using products. For product groups where ENERGY STAR® labels are not yet available, State will select products that are in the upper 25 percent of energy efficiency as designated by FEMP. State will incorporate energy efficient criteria consistent with ENERGY STAR® and other FEMP designated energy efficiency levels into all guide specifications.

Alternative Fuel Vehicles

State has acquired three alternative fuel natural gas vehicles and one fleet bus. State included diplomatic security pursuit units in the acquisition request for 100 percent natural gas units. The aim of the alternative fuel program is to convert all bus fleet units to 100 percent natural gas consumption and obtain an all alternative fuel motor pool with a fuel-re-supply station at NFATC.

Environmental Benefits of Energy Management

State promotes ride-sharing programs in coordination with GSA and disseminates information on government-wide ride-sharing programs. Vanpools automatically receive parking permits. State has been involved with the Council of Governments network to

expand and enhance ride-sharing.

FBO will continue to develop and implement energy conservation measures through its Architectural and Engineering Guidelines and Criteria for New Embassy Buildings.

Energy Management Contact

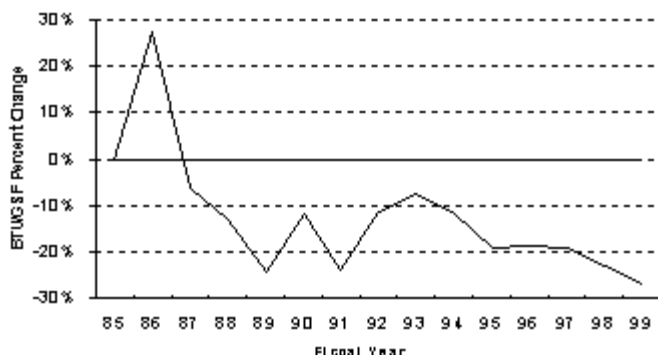
Mr. Richard T. Arthurs
Energy Manager
Facilities Management and Support Services
Department of State
A/OPR/FMSS
2201 C Street, NW
Washington, DC 20520
Phone: 202-647-8970
Fax: 202-647-1873

11. DEPARTMENT OF TRANSPORTATION (DOT)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Transportation reported a decrease in energy consumption in buildings of 26.7 percent in Btu per gross square foot compared to FY 1985.

DOT Performance Toward Buildings Energy Reduction Goals



DOT Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	1,994.4	40,068.9
Fuel Oil	791.9	4,681.2
Natural Gas	895.1	5,058.9
Propane	32.0	309.0
Purchased Steam	9.2	119.2
Total	3,722.6	50,237.2

Operations and maintenance procedures are decentralized within DOT. Basic procedures include securing HVAC equipment, unnecessary lighting, and office equipment during unoccupied hours. The Federal Aviation Administration (FAA) even reduces runway lighting when it will not compromise safety.

DOT has completed more than 100 audits. These audits identified energy and water conservation opportunities with an estimated implementation cost of more than \$20 million. During FY 1999, the U.S. Coast Guard (USCG) implemented energy related projects costing \$6 million. USCG currently estimates that it has an \$18 million backlog for projects, audits, and metering. FAA currently estimates it has a project backlog of more than \$60 million.

The following energy and water conservation audits and initiatives were under way or completed during FY 1999:

- The Federal Highway Administration (FHWA) replaced old inefficient cooling towers with new more efficient units with variable frequency drives and electric water level controls.
- The Maritime Administration (MARAD) installed waterless urinals and new energy-efficient windows at the U.S. Merchant Marine Academy.
- MARAD installed dual fuel boilers using interruptible gas service thereby reducing fuel oil use by 80 percent.
- The St. Lawrence Seaway Development Corporation (SLSDC) replaced roofs and windows for better insulation on their maintenance facilities.

Solar and Other Renewable Energy

The FAA Southwest Region has an ongoing project to install photovoltaic panels and batteries at remote and unmanned sites. Six remote communication link sites in the Western Pacific Region received panels in FY 1999. The FAA Alaskan Region received a grant from the National Renewable Energy Laboratory (NREL) and installed two wind turbine generators.

During FY 1998 and FY 1999, USCG received funding from DOE to help purchase and install a solar hot water system for housing units in Hawaii. USCG continues to pursue financing options to make up the shortfall. The DOE grant completed a limited portion of the whole project, and USCG is looking into using DOE's Technology-Specific Super ESPC to complete the rest. When completed, the project will make a significant contribution to achieving the Million Solar Roof Initiative.

Both USCG and SLSDC continue to use photovoltaic powered buoys.

Showcase Facilities

DOT's headquarters building was designated as a showcase in 1995. Energy improvements avoid \$1 million in cost each year.

Personnel Development

Each personnel office and operating administration has been advised of the requirement for energy and water efficiency to be included in performance evaluations.

The FAA has established an energy and water conservation category within their environmental excellence award program. Operating administrations are strongly encouraged to nominate employees for the

annual Federal Energy and Water Management Awards.

During FY 1999, the USCG energy program sponsored three training sessions; subjects included the USCG facilities energy program and ESPCs. All FAA regional energy managers and center energy managers have been trained in the use of ESPCs.

The FAA's Mike Monroney Aeronautical Center (MMAC) has developed its own manager's energy conservation guidelines handbook that has been distributed to all managers and energy coordinators.

Funding

DOT leverages funding for surveys and audits. The USCG and the FAA have both used DOE FEMP's SAVEnergy program and utility company incentive programs.

In FY 1999, MMAC received \$65,000 earmarked for energy projects, all of which was used on a hanger lighting retrofit project.

Energy Savings Performance Contracts

There are currently six ESPCs in place within DOT. The USCG expects to sign ESPC delivery orders at its Air Station Cape Cod and Support Center Elizabeth City under DOE's Northeastern and Mid-Atlantic Super ESPC's in the very near future. The FAA has been actively working towards three additional Super ESPC delivery orders for award in FY 2000.

Annual cost savings after the term of the contract from the four ESPCs awarded during FY 1998 will be in excess of \$1,438,000, with annual energy savings in excess of 100 billion Btu, which is more than one percent of DOT's primary facilities energy consumption in FY 1998. As savings are realized from ESPCs they will be reinvested in new energy projects.

Utility Partnerships

The FAA received over \$209,000 in incentives from various utilities around the country during FY 1999. The USCG also received \$680,000 in incentives which were used to shorten the term of the ESPC at the USCG Academy in New London, Connecticut.

Procurement of Energy Efficient Products

DOT purchases 'best practice' products that are practical and cost-effective and in the upper 25 percent of energy and water efficiency. The FAA has provided its energy managers, purchasing agents, and contracting officers with the DOE FEMP publication *Buying Energy Efficient Products*.

Environmental Benefits of Energy Management

USCG's energy program has actively engaged in the development of a number of ENERGY STAR® Buildings. EPA is providing guidance and DOT is in the process of assessing performance. These buildings have all undergone comprehensive audits and are in various stages of development.

Energy Management Contact

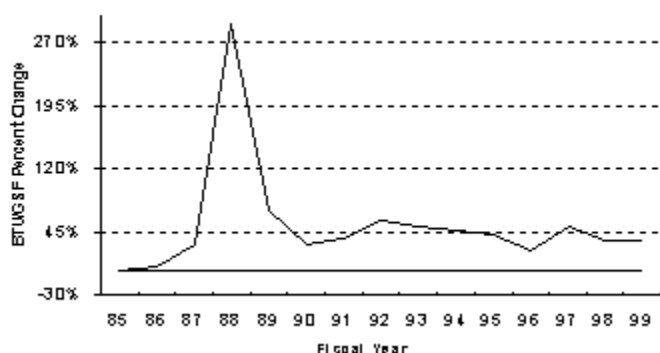
Mr. George Kuehn
Administrative Services Policy Division
U.S. Department of Transportation
Room 2318, Mail Code M43
400 7th Street, SW
Washington, DC 20590
Phone: 202-366-1614
Fax: 202-493-2006

12. DEPARTMENT OF THE TREASURY (TRSY)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of the Treasury reported an increase in energy consumption in buildings of 34.9 percent in Btu per gross square foot compared to FY 1985. This statistic is misleading in that it has not been adjusted to account for a quadrupling of energy usage, over the 1985 base year, which occurred in 1988 when the General Services Administration (GSA) delegated to Treasury the energy reporting responsibility for 35 buildings. Of the 35 buildings that GSA delegated, 32 were Internal Revenue Service (IRS) facilities.

Treasury Performance Toward Buildings Energy Reduction Goals



Treasury Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	1,123.4	23,324.1
Fuel Oil	39.9	157.3
Natural Gas	466.2	1,806.2
Propane	3.4	25.5
Purchased Steam	68.7	1,013.8
Total	1,701.6	26,326.9

Over the next two years the U.S. Mint will have a significant increase (45 percent) in energy consumption due to the Commemorative Quarter Program and the new dollar coin. Although the Mint strives to meet the goals and objectives of EPA Act and Executive Order 13123, the process of stamping coins is an energy intensive activity, and the Mint is subject to the requirements of Congress and the nation's demand for coinage.

The following energy and water conservation audits and initiatives were under way or completed during FY 1999:

- The Internal Revenue Service's (IRS) Andover Service Center, Massachusetts continued its upgrade program with their three chillers being interconnected allowing for better load management. This will save approximately \$4,000 and 165,000 cubic feet of water annually.
- The Main Treasury building rehabilitation work began. The Treasury Building & Annex Renovation and Restoration (TBARR) project will incorporate a lighting retrofit, window replacement, motor upgrades, installation of an energy management and control system, new energy-efficient chillers, upgrade of the cooling towers, and a dramatic reduction in water consumption. The project will also separate the sanitary and storm drain systems.
- The Office of Thrift Supervision (OTS) upgraded their direct digital controls, installed new motor control centers, and a new high-pressure steam reducing station which is expected to reduce usage by 15 percent.
- The Financial Management Services (FMS) replaced motors and tube bundles at their steam/water converter with expected steam and cost reduction of 15 percent, and recalibrated their pneumatic controls with an expected 10 percent steam consumption saving.
- The Federal Law Enforcement Training Center (FLETC) in Glynco, Georgia completed a lighting retrofit in two buildings and expects to finish retrofitting three additional buildings in FY 2000.

Personnel Development

During FY 1999, Treasury sent eight employees to energy management training courses. DOE FEMP courses were used whenever possible due to their low cost and high quality.

Energy Savings Performance Contracts

The U.S. Secret Service entered into a second ESPC for their Beltsville, Maryland training facility. The ESPC with Baltimore Gas and Electric covered a lighting retrofit in all buildings and installation of daylighting in five buildings. Savings are expected to be \$39,000 annually. The installation of the oil to gas conversion under the FY 1997 ESPC with Washington Gas was completed. Savings of \$15,000 per year began with the November 1998 bill.

The Mint has awarded three ESPCs in the last two

years, producing estimated savings of 3.913 billion kilowatts, more than 3 million gallons of water, and \$410,000 annually.

The Bureau of Engraving and Printing is discussing the possible development of an ESPC with PEPCO.

Utility Partnerships

The IRS's Andover Service Center entered into a GSA Area-wide contract in June 1999 to purchase electricity. Savings are expected to be \$100,000 per year. The facility also switched to the Massachusetts Electric Company's interruptible rate schedule, saving \$4,500 per year. IRS's Brookhaven Service Center participated in the commercial peak reduction program with their local utility, resulting in a reimbursement of an estimated \$90,000 per year.

The Mint entered into a GSA Area-wide contract in January 1999 to purchase electricity. The Mint saved \$102,000 in FY 1999. The Mint also renegotiated its contract with the steam utility in Philadelphia for a saving of \$100,000 in FY 1999.

Funding

Treasury bureaus spent \$1.495 million to install energy and water conservation measures during FY 1999. This figure does not reflect GSA's expenditure in buildings delegated to Treasury. Anticipated savings from the FY 1999 investments total \$107,000 per year.

The bureaus plan to spend \$1.1 million in FY 2000, to implement energy efficiency measures. The bulk of this spending will be at the Main Treasury building and Mint facilities.

Procurement of Energy Efficient Products

Treasury is committed to the purchase of products in the top 25 percent of energy efficiency. Copies of DOE's *Energy Efficient Product Guide* have been provided to energy managers and procurement personnel.

Alternative Fuel Vehicles

The AFV fleet number at the Bureau of Alcohol, Tobacco, and Firearms (ATF) has reached 9 percent of its total. FLETC has six with two being police packages used on the pursuit training course. The IRS added its first AFV during FY 1999.

Environmental Benefits of Energy Management

The bureaus have implemented driver awareness programs aimed at getting employees to drive in the most fuel efficient manner possible. Treasury is developing a telecommuting policy that will allow for work at home, satellite facilities, and hotels.

Energy Management Contact

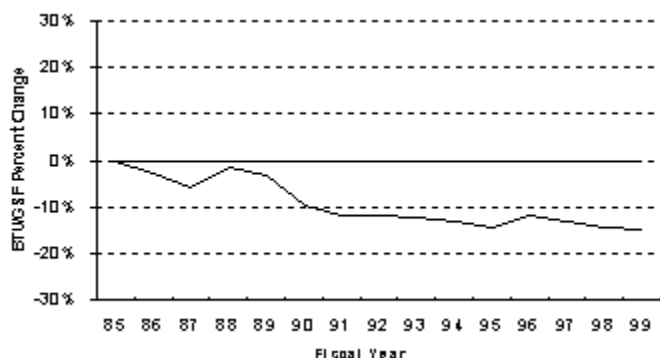
Mr. Bill McGovern
Environment and Energy Programs Officer
Department of the Treasury
1310 G-400 West
1500 Pennsylvania Avenue, NW
Washington, DC 20220
Phone: (202) 622-0043
Fax: (202) 622-1468
E-mail: william.mcgovern@do.treas.gov

13. DEPARTMENT OF VETERANS AFFAIRS (VA)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Veterans Affairs reported a decrease in energy consumption in buildings of 14.9 percent in Btu per gross square foot compared to FY 1985.

VA Performance Toward Buildings Energy Reduction Goals



VA Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	9,411.0	165,400.7
Fuel Oil	952.6	3,512.0
Natural Gas	14,270.3	50,317.0
Propane	2.2	19.3
Coal	139.7	142.1
Purchased Steam	1,209.0	9,529.7
Other	150.0	635.2
Total	26,134.8	229,556.1

During FY 1999, VA concentrated heavily on research for and the development of cost-effective methods such as utility rebates and ESPCs.

The design criteria for all new construction and retrofits now include the use of the most energy-efficient lighting fixtures that have savings potential of up to 45 percent. Energy management and control systems with direct digital controls are specified as part of new construction as well as retrofits.

Two medical centers have recently completed projects using a thermal storage system using incentives from local utility companies.

Solar and Other Renewable Energy

Some medical centers are evaluating the use of solar and other renewable energy projects as part of their ESPCs.

Personnel Development

VA conducted a national survey to determine how many energy managers at the medical centers qualify as trained energy managers. Survey results were submitted to DOE who determined that many would need some training before they could qualify as trained energy managers. Staff have been informed of relevant DOE and Association of Energy Engineers classes they need to take. Many took advantage of these during FY 1999 and will continue to do so in the future.

Funding

VA's funding for energy conservation cost-effective retrofits and capital improvement projects was approximately \$10.5 million for FY 1999.

Energy Savings Performance Contracts and Utility Partnerships

VA completed its first ESPC in 1993. Since then, VA has issued guidance to all medical centers regarding their use of ESPCs. The following projects have been completed:

- Medical Center, Lake City, Florida, completed a lighting retrofit.
- Medical Center, Dallas, Texas, completed the installation of a thermal water storage system.
- Medical Center, Richmond, Virginia, completed the installation of cooling towers.
- Medical Center, Portland, Oregon, completed a lighting retrofit, including installation of occupancy sensors.
- Medical Center, Atlanta, Georgia, completed a lighting retrofit.
- Medical Center, West Los Angeles, California, completed a comprehensive energy retrofit.

As of the fourth quarter of FY 1999, the Veterans Integrated Service Networks (VISNs) are in various planning stages for ESPC implementation. The following number of facilities have progressed in implementation efforts and have decided the ESPC method they are planning to use:

Station level contracts - 13 facilities
DOE-based contracts - 42 facilities
DOD-based contracts - 56 facilities
GSA Area-wide based contracts - 14 facilities

Contractor investment of \$54.53 million will generate \$8.99 million in savings to VA in operating and utility cost avoidance during the life of these projects.

Procurement of Energy Efficient Products

VA's acquisition and material management service has issued guidelines for the medical centers to purchase energy-efficient products whenever they meet VA's performance requirements, and they are cost-effective.

Energy Management Contact

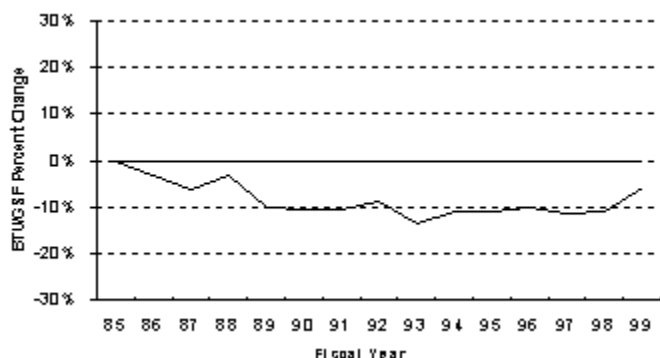
Mr. Rajinder P. Garg
Chief, Energy Management Division (138C1)
U.S. Department of Veterans Affairs
Room 417-LAF
810 Vermont Avenue, NW
Washington, DC 20420
Phone: 202-273-5843
Fax: 202-273-6298

14. ENVIRONMENTAL PROTECTION AGENCY (EPA)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Environmental Protection Agency reported a decrease in energy consumption in buildings of 5.7 percent in Btu per gross square foot compared to FY 1985.

EPA Performance Toward Buildings Energy Reduction Goals



EPA Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	463.4	7,084.8
Fuel Oil	19.3	74.7
Natural Gas	639.9	2,453.7
Propane	0.7	9.2
Purchased Steam	46.9	579.6
Total	1,170.1	10,202.0

The main objective of EPA's Energy and Water Conservation Program is to effectively and efficiently use natural resources when designing, constructing, and maintaining EPA facilities and facility systems.

Although EPA could have exempted all of its facilities from reporting because as laboratories they all fall under the original industrial facility exclusion, EPA established and met the 10 percent energy reduction goal in 1995 as required by EPCA for nonindustrial facilities. EPA will continue to strive to meet the more ambitious 30 and 35 percent reduction goals of EPCA and Executive Order 13123.

While implementing its energy program, EPA has learned that its largest energy conservation opportunity is within the HVAC system of its laboratories. Due to energy-intensive health and safety requirements for one-pass air for a laboratory, EPA's energy consumption is extraordinarily high. To address this, EPA is

aggressively pursuing energy-efficient upgrades at several of its laboratories.

Excluding new facilities, EPA's water consumption decreased 6.3 percent in FY 1999. Several facilities reduced water consumption by more than 20 percent including Narragansett, Rhode Island; Gulf Breeze, Florida; Duluth, Minnesota; Las Vegas, Nevada; and, Manchester, Washington. EPA expects significant reductions in water consumption at its facilities by installing ground source heat pumps.

Descriptions of facility energy and water reduction activities worked on during FY 1999 include:

- Athens, Georgia. A biomass feasibility study has been completed with the help of DOE, Tennessee Valley Authority, USDA, University of Georgia, and Georgia State Forestry. The next project phase will determine what equipment is suited to the Athens laboratory. Also, a solar hot water heater was installed at the on-site day care center, and has contributed to the 17 percent decrease in energy consumption at the facility from 1997 to 1999.
- Ada, Oklahoma. The Ada Facility decreased energy consumption by 15.5 percent from FY 1997 to FY 1999. To further streamline its energy usage, the laboratory will soon undergo a comprehensive energy efficiency upgrade of its HVAC system. The upgrade will include installation of a ground source heat pump system, complete variable air volume system for air supply and fume hood air exhaust, and an integrated direct digital control system for HVAC, energy, fire, and security management.
- Cincinnati, Ohio. Energy-efficient projects for this facility included installing a closed-loop glycol cooler tower, energy-efficient elevator motors, boiler controls, a revolving door to help maintain temperature and building pressure, a new HVAC system, improved windows and insulation, adopting the Green Lights program, and a new energy-efficient boiler.
- Ft. Meade, Maryland. EPA completed occupancy of its new laboratory facility at the Ft. Meade Army base in the spring of 1999. The facility was designed with a variety of advanced energy components including variable air volume technology.

- Houston, Texas. This facility conducted air system modifications and upgraded an existing direct digital control (DDC) system. It incorporated a cooling tower condensate return system to reduce water consumption and operating costs and to enhance environmental conditions. Without this system, large volumes of water would have to be supplied by the local water utility.
- Narragansett, Rhode Island. EPA is designing an HVAC system upgrade that will use geothermal heat pumping and latent energy recovery technologies. In addition, EPA is researching the purchase of green power for this facility as well as a wind-powered electric generator for the site.
- Golden, Colorado. EPA incorporated a variety of energy-efficiency components including a DDC system to monitor operating conditions of HVAC systems. By monitoring equipment in this way, the facility is saving time, money, and energy by fixing problems immediately. Further, EPA applied for a DOE renewable energy project grant to build a transpired solar collector panel for the south wall of the facility's hazardous materials building. In addition, EPA is currently negotiating with NREL to purchase wind power to serve 20 percent of its electricity needs.
- Gulf Breeze, Florida. EPA installed timers on approximately 20 electric water heaters and is installing nodal direct digital controls (NDDCs). The NDDCs will improve building controls to minimize energy waste and monitor building security, fire protection, and indoor environmental quality.

Solar and Other Renewable Energy

By partnering with Virginia Alliance Solar Electricity (VASE), Solarex, PowerLight, and the Department of Energy (DOE), EPA successfully arranged for \$500,000 in financial assistance for a partially solar-powered computer center at EPA's Research Triangle Park (RTP) facility. When construction on the National Computer Center is completed, it will mark the opening of one of the largest photovoltaic (PV) installations on the east coast. The 100-kilowatt, integrated roof power system will convert the sun's light into energy, feeding it directly to the building and supplementing the main power utility. Among one of the largest single PV systems in a Federal facility, the RTP computer center not only gives EPA the opportunity to demonstrate the effectiveness and marketability of an alternative technology, but it also serves as a powerful example of the Agency's commitment to sustainable energy principles. In addition, the PV system supports the

Million Solar Roofs initiative, which challenges American businesses and communities to install solar systems on one million roof tops by 2010. More specifically, the RTP installation supports President Clinton's 1997 commitment that the Federal Government alone will install 20,000 solar rooftop systems by 2010.

EPA recently installed three solar energy water-heating systems at its Edison, New Jersey facility that are now the primary source of hot water in their respective facility areas. All three solar heating systems consist of a preheat tank and various numbers of roof-mounted, single glazed, liquid evacuated tube collectors. To date, energy savings results are significantly higher than expected.

EPA's leased laboratory facility in Richmond, California is in the planning stages of a third party financing agreement for energy efficiency improvements to be provided by the owner of the facility. In addition, 100 percent of the electricity for the laboratory is green power provided by landfill methane gas.

Personnel Development

EPA's Office of Administration (OA) has instituted a semi-annual conference entitled "Laboratories for the 21st Century" for agencies pursuing energy upgrades in Federal laboratories. EPA and DOE partnered in this effort. The 1999 conference was held in Cambridge, MA. Almost 200 participants attended the conference, which was open to both Federal and non-Federal participants for the first time.

Energy Savings Performance Contracts (ESPCs)

An Energy Savings Performance Contract (ESPC) to conduct a complete energy upgrade at the National Vehicle and Fuel Emissions Laboratory (NVFEL) in Ann Arbor, Michigan was awarded in the Spring of FY 1998. The new energy system currently being installed will guarantee at least a 66 percent reduction in energy consumption. The planned energy upgrade will establish NVFEL as an energy and environmental showcase facility by reducing source emissions, energy consumption, energy costs, and incorporating renewable technologies. Installation of a real-time demand meter will help the facility reduce its electrical demand peak. The project will be completely operational in the summer of 2000.

EPA is planning to use ESPCs to finance comprehensive energy upgrades at the following facilities: Narragansett, Rhode Island; Manchester, Washington; Gulf Breeze, Florida; Athens, Georgia; and Ada, Oklahoma. EPA expects to achieve a 50

percent reduction from current energy consumption levels for each facility undergoing a comprehensive upgrade paid through an ESPC.

Acquisition of Alternative Fuel Vehicles (AFVs)

EPA made significant progress in increasing its acquisition percentage of Alternative Fuel Vehicles (AFVs) during FY 1999. EPA expects that this success increase in meeting the AFV acquisition targets set forth by Executive Order 13123 will continue. Already, EPA has been able to increase from a 14 percent acquisition rate in FY 1997, to 35 percent in FY 1998, and has been able to achieve 56 percent in FY 1999.

Environmental Benefits of Energy Management

EPA has developed personnel performance standards to rate staff efforts toward achieving energy and water conservation program objectives—outstanding, satisfactory, and unsatisfactory. Implementation of these standards helps ensure that personnel will consider energy-efficient opportunities.

OA has a steering committee to organize EPA's integrated pollution prevention management program, that includes EPA energy and water conservation efforts.

EPA is committed to purchasing best-practice energy-efficient and water-saving products that are in the upper 25 percent of all products in that category. EPA is also committed to purchasing emerging technologies and products that offer greater energy-efficiency, water savings, or use of renewable resources than products now commercially available.

EPA is committed to accelerating the acceptance of cleaner power alternatives and has established a pilot project at its Richmond, California facility. In May, 1999, EPA, the National Renewable Energy Laboratory, and GSA awarded a renewable energy contract to the Sacramento Municipal Utility District (SMUD). SMUD now provides the Lab with 100 percent renewable electricity from a landfill gas plant. Purchasing renewable electricity at the Region 9 Lab reduces greenhouse gas emissions associated with fossil fuel-based power by more than 2.3 million pounds per year. This is equivalent to reducing the number of automobile miles driven annually in California by two million miles. The project also makes EPA the first government entity to implement the use of green power at one of its facilities.

The Agency also plans to implement green power purchasing at its Chelmsford, Massachusetts, and Golden, Colorado, facilities. When these transactions are completed, the Chelmsford facility will purchase

100 percent of its electricity from renewable power sources and the Golden facility will purchase 35 percent. In addition, EPA is supporting a biomass combined heat and power system at the U.S. Department of Agriculture field station in Athens, Georgia. This project could reduce EPA's Athens-ORD facility's reliance on traditional electricity energy sources by 100 percent.

A series of energy awareness posters have been developed, illustrating energy-efficient HVAC systems, ESPCs, and pollution prevention. These posters are displayed at all EPA functions.

EPA continues to produce and distribute its quarterly newspaper, *Greening EPA*, formerly *Conservation News*. Articles in this newspaper provide the basis for facility managers to implement campaigns to conserve energy and at the same time inform the general public about EPA-specific conservation activities. EPA's Web site also offers a great opportunity to spread the energy and water conservation word, and includes the latest issue of *Greening EPA*.

Energy Management Contact

Mr. Philip Wirdzek

Facilities Management and Services Division

Mail Stop 3204

U.S. Environmental Protection Agency

401 M Street, SW

Washington, DC 20460

Phone: 202-260-2094

Fax: 202-401-8971

15. GENERAL SERVICES ADMINISTRATION (GSA)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the General Services Administration reported a decrease in energy consumption in buildings of 17.0 percent in Btu per gross square foot compared to FY 1985.

GSA Performance Toward Buildings Energy Reduction Goals



GSA Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	8,814.6	181,734.3
Fuel Oil	68.4	248.7
Natural Gas	2,841.2	13,288.9
Purchased Steam	1,359.8	19,760.5
Total	13,083.9	215,032.4

GSA has had an energy reduction plan since 1991. The plan was updated in 1998, which coincided with GSA's creation of an Energy Center Of Expertise and reflects the new approved business plan. The Energy Center of Expertise will reduce utility costs by promoting optimal energy use while protecting the environment and ensuring a quality workspace for GSA clients.

The Energy Center will have approximately 25 staff, plus regional associates. There are five people in Kansas City, Missouri; seven in the Public Utilities Center in Washington, DC; seven in the National Energy and Water Management Center in Fort Worth, Texas; and one or two regional associates in each of GSA's 11 regions.

Over the past few years, GSA has been installing state of the art building automated control systems, occupancy sensors, variable speed drives, efficient lighting, and other energy savings technologies. GSA has partnered with the National Institute of Standards

and Technology in testing ASHRAE's BACNet standard, an open communication protocol for building automated controls. This testing was continued in 1999 with an \$800,000 addition to the BACNet project.

GSA's Energy Center of Expertise has several objectives:

- Optimize utility management and life-cycle costs and enhance building operations efficiency;
- Establish GSA as the Government's provider of choice for utility commodities and services;
- Encourage advocacy and partnering; and,
- Provide leadership and promote energy efficiency and renewable energy.

In order to respond to the needs of Federal agencies, the Energy Center provides:

- Area-wide contracts for the procurement of utilities and for the acquisition of value-added services, such as utility financing of energy conservation projects;
- Aggregate purchasing of natural gas and electricity in deregulated markets;
- Energy use and analysis data; and,
- Advocacy in the public policy arena to include renewable power sources as part of its energy portfolio.

GSA performs audits on 10 percent of its building inventory each year in accordance with GSA's 10-year audit plan, which is updated annually. Comprehensive audits are performed by a variety of agents: in-house personnel, utilities, DOE-FEMP's SAVEnergy contractors, and A/E contractors. Some audits are obtained at no cost from utilities, some are obtained through DOE's SAVEnergy audit program, and the rest are funded by GSA. As funding permits, GSA will implement all life cycle cost-effective projects with a payback of 10 years or less that are identified by these audits.

GSA has traditionally encouraged a reduction in the use of petroleum-based fuel as far back as the 1973/1974 oil embargo. From the 1975 former base year to the 1985 present base year, GSA reduced oil use from approximately 18.5 million gallons in Federally owned buildings to about 7.6 million gallons in 1985 in both owned and leased buildings. From 1985 to 1999, GSA petroleum-based fuel use in buildings dropped by 89 percent, from 7.6 million to 842.1 thousand gallons.

Solar and Other Renewable Energy

GSA considers opportunities for solar and other renewable energy in building design and retrofits. When GSA performs an energy audit of a facility, renewable opportunities are identified and implemented if they are life-cycle cost effective. In addition, The Facility Standards for Public Buildings, PBS P100.2 incorporates language for solar/renewable sources to be considered in the proposed design.

GSA is a participating agency in the Million Solar Roofs initiative. GSA developed a plan to install 220 solar roof projects as defined by DOE under the initiative by the year 2010.

Showcase Facilities

GSA has the first Federal building to receive an ENERGY STAR® Building designation—its property at 290 Broadway, New York City, New York. GSA has been working with EPA and has uploaded information regarding over 700 GSA buildings into the EPA ENERGY STAR® Building web site. GSA is in the process of field verifying the data and will be applying for ENERGY STAR® Building designations as appropriate.

Personnel Development

Under Sec. 156 of the Energy Policy Act of 1992, GSA is required to hold five energy management workshops for Federal, state, local and tribal communities. In 1999, GSA held seven workshops in partnership with Federal agencies and state governments.

These workshops included the following dates, locations and activities:

- April 6, 1999 “Water Conservation in Public Buildings” in Denver, CO with 65 attendees
- August 23-25, 1999 “Energy/Water Conservation and Utility Deregulation” in Orlando, FL with 1,100 attendees
- January 27-28, 1999 “Utility Deregulation in NY and NJ” in Albany, NY with 125 attendees
- January 4-5, 1999 “Utility Deregulation in Northeast States” in Arlington, VA with 300 attendees
- June 15-18, 1999 “Utility Deregulation” in San Diego, CA with 65 attendees
- November 16-17, 1998 “Border States Energy Forum” in Chihuahua, Mexico with 270 attendees
- December 2, 1998 “Data Gathering for Deregulation” in New York with 25 attendees

- January 29, 1998 “Deregulation in New York City” in New York, NY with 325 attendees

GSA continues to train its own personnel in all aspects of energy and water management and conservation. GSA currently has 28 trained energy managers on staff. Routine training includes such topics, among others, as:

- Industrial Energy Processes and Building Analysis
- ASHRAE 90.1
- Energy Management Techniques
- Building Life Cycle Costing

Energy reduction and utility cost reduction goals are tracked as part of GSA’s performance evaluation to the President. Senior management and regional senior management executives have energy performance included as part of their performance evaluation. In each region, Regional Energy Coordinators’ performance evaluation and position descriptions included a full range of energy efficiency, water conservation, and renewable projects in their descriptions.

GSA annually participates in the DOE Federal Energy and Water Management Awards program and received nine awards at the October, 1999 program. GSA internally honors each one of the DOE award recipients with a ceremony and monetary award.

Funding

Funding for projects has been lower than needed to meet GSA’s energy reduction goals. GSA had planned to invest \$50 million per year from 1994 through 2000 in order to meet the 20 and 30 percent reduction goals. The actual appropriation, after recessions, has averaged \$16.8 million over 6 years. GSA is able to fund some energy audits at no cost through utilities, or through DOE’s SAVEnergy Audit Program. Other programs, such as GSA’s annual Repair and Alterations Program, as well as the Chlorofluorocarbon (refrigerant) Chiller Replacement Program, also invest in energy efficient facilities and equipment. However, the sum of these investments may not be sufficient for GSA to meet the energy reduction goals.

Energy Savings Performance Contracts (ESPCs)

GSA's Regional Energy Coordinators in each region identify energy conservation opportunities and opportunities for Energy Savings Performance Contracts (ESPCs). The Coordinators assemble and manage the project team, which may include a contracting officer, legal council, a project manager, or others as necessary. The Energy Center of Expertise coordinates congressional notification, provides guidance and information of best practices, and promotes the use of ESPCs. The Office of Finance pays the contractor and implements GSA accounting procedures.

GSA is currently pursuing 6 active projects to be funded through ESPCs although only 2 have been awarded.

In FY 1999, GSA is negotiating with Honeywell, Inc. for a \$1,500,000 contract for energy conservation measures at the Leo O'Brien Federal Building in Albany, NY.

In FY 1999, GSA Region 4 is working with 3 Super ESPC contractors in 3 different states to consider contractor identified energy conservation opportunities. To date, only 1 contract will be signed late this fiscal year. GSA is currently waiting for the congressional notification time period to expire prior to signing the contract. This project includes a \$9 million chiller plant replacement at the Richard B. Russell Federal Building and Courthouse.

The annual savings anticipated from GSA's ESPCs and utility contracts currently in place are 52,298 million BTU and \$1.73 million.

Utility Partnerships

In 1999, GSA used area wide utility contracts and basic ordering agreements to obtain utility financing of energy projects as follows:

- In Vermont, GSA completed construction and started payments on four utility financed projects at U.S. Border Station facilities that were awarded in 1998. These projects consisted of installing energy efficient T-8 lighting and electronic ballast retrofits. Total project costs were \$4,872, with an expected annual savings of \$3,735 and 153.71 MMBtus.
- In Florida, a \$235,226 project financed through the GSA utility area wide contract started payments in September, 1998.
- In GSA Region 4, a \$1,102,128 project is

scheduled to start payments in October, 1999.

- GSA Region 11 started payments on a \$1,589,884 utility financed project. Also, Region 11 is working with the utility company to implement a \$20 million utility financed cogeneration project.

Procurement of Energy Efficient Products

GSA continues to support the procurement of energy efficient products through a number of activities. GSA provides product supply schedules that promote energy efficient and environmentally preferable products and mandates the purchase of ENERGY STAR® computers and office equipment. GSA is a signatory to and an active participant in the "Procurement Challenge," a DOE FEMP interagency program designed to identify the most energy efficient products and to increase the purchase of these projects.

Environmental Benefits of Energy Management

GSA continued advocating Planet GSA, which calls attention to four key areas in which GSA already plays a significant role: "buying green," "building green," "driving green," and "saving green." GSA is working on these four areas while pursuing its mission of creating great workplaces.

- *Buying Green.* GSA manages a nationwide recycling program for 650,000 Federal employees in 1,100 Federal buildings. GSA is going paperless in the procurement process and using electronic billing and payment systems. GSA products are advertised on the Internet at <http://www.gsa.gov>. GSA's Environmental Products Guide carries over 3,000 products and services that are environmentally oriented.
- *Building Green.* GSA will implement sustainable design principles in designing, constructing, modernizing, and disposing of its buildings. In FY 1998, GSA funded experts to design the Denver Courthouse projects to serve as a model for its sustainable buildings program. GSA chooses products with recycled content, for example: insulation, cement and concrete, latex paint, carpets, shower dividers, and restroom partitions. GSA installs water-saving devices and plumbing fixtures. GSA reduces the amount of construction waste it produces.
- *Driving Green.* GSA bought 24,000 alternative-fuel vehicles (AFVs) for the nationwide Federal fleet GSA manages. AFVs can run on ethanol, methanol, natural gas, or electricity thereby reducing reliance on foreign oil; they also create less pollution than gasoline engines. The Energy

Policy Act of 1992 requires that within the largest cities in 1998, 50 percent of all new vehicles must use alternative fuel. GSA's objective for FY 1999 is that 75 percent of such vehicles will be AFVs. To help meet the challenge, GSA has waived lengthy justifications to upgrade from a compact sedan to a mid-size AFV.

- *Saving Green.* GSA follows the Energy Center of Expertise business plan that includes installing the most energy efficient equipment to operate its building mechanical systems. In New York and San Francisco, GSA is testing new lighting technologies and lighting-control strategies. In the Northeast, GSA has awarded a contract that can provide "green power" for up to five percent of Federal needs. GSA is a recognized leader in energy conservation. GSA has contracted on behalf of EPA to purchase 100 percent green power for EPA's Richmond, CA lab.

GSA has signed the DOE and EPA MOU for ENERGY STAR® Partnerships and received a charter member designation for the Foley Square Federal Building at 290 Broadway in New York City. This was the only Federal Building to receive and ENERGY STAR® Building designation. GSA worked with EPA to upload data about GSA's building inventory into the Benchmarking tool web site. Over 700 buildings have been preliminarily evaluated and it appears that over 200 will qualify as ENERGY STAR® Buildings. GSA will take actions to increase the number qualifying buildings.

Energy Management Contact

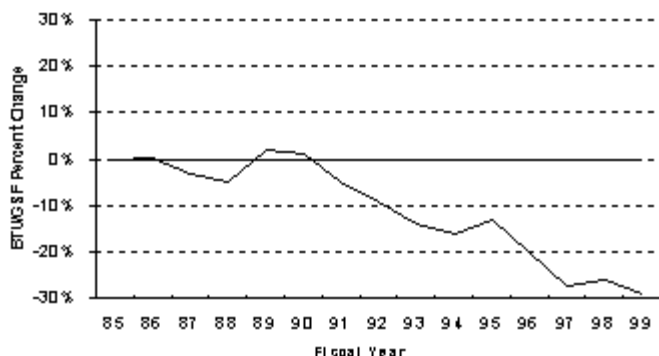
Mr. Mark Ewing
Director, Energy Center Of Expertise
General Services Administration
1500 East Bannister Road
Kansas City, MO 64131-3088
Phone: 816-823-2691
Fax: 816-823-2696

16. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

Energy Efficiency Performance and Implementation Strategies

During FY 1999, the National Aeronautics and Space Administration reported a 28.9 percent reduction in buildings energy consumption in Btu per gross square foot compared to FY 1985.

NASA Performance Toward Buildings Energy Reduction Goals



NASA Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	2,433.4	35,502.0
Fuel Oil	78.5	281.0
Natural Gas	1,221.0	4,113.0
Propane	4.6	30.0
Purchased Steam	110.3	3,089.0
Total	3,847.8	43,015.0

NASA manages nine Centers, one Federally Funded Research and Development Center (FFRDC), and several component facilities and off-site program facilities from its Washington, DC, Headquarters.

NASA's mission variable and industrial facilities, although exempt from NECPA requirements, are the Agency's biggest energy consumers, representing over 60 percent of total facility energy costs. For this reason, NASA has established an internal goal to improve the energy efficiency of mission-variable buildings by 10 percent by FY 2000 compared to FY 1985 levels, where cost-effective and without adversely affecting mission performance.

From FY 1991 through FY 1999, NASA completed energy audits for 74.4 percent of its total building square footage, including 74.3 percent of non-exempt square footage, and 74.5 percent of exempt and industrial square footage.

Dryden Flight Research Center requested DOE SAVEnergy audits for seven buildings totaling 420,000 square feet. The comprehensive audits will be conducted in early FY 2000.

Langley Research Center initiated a survey of approximately 32 laboratories to determine where once-through cooling watersystems exist. These systems will be replaced with alternate cooling systems where cost-effective.

During FY 1999, NASA implemented several projects identified during energy efficiency audits. Glenn Research Center completed a project to install new HVAC units, water lines, and lighting in its Building 14. The project is expected to save \$52,300 annually. The Center initiated a project to rehabilitate the mechanical system in Building 77 with new four-pipe fan coil units and lighting. This project is expected to save \$26,400 annually. The mechanical and electrical systems in Building 302 are also being rehabilitated with new exhaust fans and office fan coil units, modern office lighting, and replacement windows. This project is expected to save \$62,200 annually.

Langley Research Center initiated various maintenance augmentation tasks including roofing and HVAC replacement projects at a cost of \$2.2 million. These projects will save \$446,000 annually.

Goddard Space Flight Center initiated HVAC and lighting system upgrades in various buildings that will reduce energy costs by \$59,000 annually. The Center also continues to expand the control capabilities of its direct digital control energy management control system to additional buildings.

Kennedy Space Center initiated several energy efficiency projects in FY 1999. The HVAC system in the M7-351 Training Facility is being replaced with a state-of-the-art system using chilled water from the central plant, wrap-around water transfer coils, a carbon dioxide demand ventilation control, and direct digital controls. The new system eliminated use of CFC 12 refrigerant, demonstrates new technologies, and will reduce energy costs by about \$13,000 annually. The Center also replaced lighting fixtures and lamps as part of the facility rehabilitation project for the M7-657 Parachute Refurbishment Facility. The project will save \$8,000 annually. Use of parabolic louvers increases illumination at working surfaces and reduces glare from bright white parachutes. Another project was initiated to replace or retrofit lighting in the Launch Control Complex with energy efficient fixtures. The project will

reduce energy costs by \$70,000 annually by incorporating T-8 lamps with electronic ballasts and occupancy sensors. A project was completed in Building M6-342 that replaced 3-way chilled water valves with 2-way valves and installed a variable speed pumping system to reduce pumping costs. The project also installed direct digital controls to reduce overcooling and reheat, saving \$9,000 annually.

Kennedy Space Center completed a project to reuse wash and rinse water from the solid rocket booster parachute cleaning process. The reclaimed water is pumped to the Industrial Area Chiller Plant where it is reused as make-up water for the plant's cooling towers. The system reclaims 50,000 gallons of water per shuttle flight or approximately 300,000 gallons annually. This innovative project was selected to receive a 1999 Federal Energy and Water Management Award.

The Michoud Assembly Facility expanded its natural gas metering system by installing electronic natural gas meters on a number of buildings. The meters are connected to the central energy monitoring and control system. The project cost totaled \$50,000. The meters will be used to track gas consumption and calculate air emissions from industrial process equipment.

In FY 1999, the Merritt Island Launch Annex replaced a motor generator set serving an antenna with solid-state technology. Also at Merritt, installed air conditioning capacity was reduced in one building by 7.5 tons due to changes in building operations. These measures will reduce energy costs by \$2,000 annually.

NASA continues to make significant progress in reducing the use of petroleum-based fuels in buildings and facilities. Petroleum, including fuel oil and liquefied petroleum gas, represents 10 percent of NASA fuel consumption in fixed facilities and 3.6 percent of total fixed facility energy usage.

Solar and Other Renewable Energy

NASA Headquarters continued its partnership with the DOE National Renewable Energy Laboratory (NREL) to identify opportunities for increasing NASA's use of renewable energy technologies. The effort produced a draft Million Solar Roofs Implementation Plan and a guide specification for terrestrial photovoltaic power systems.

NREL also assisted several NASA Centers in developing renewable energy projects, including providing assistance to the Dryden Flight Research Center in determining the feasibility of a hybrid/modular gas-fired boiler heating system. The study concluded that solar ventilation preheat is viable

for use in reducing natural gas utilization for space heating, however, the reduction in boiler size to "right size" the units was the most cost-effective approach. NREL also completed a comprehensive renewable energy opportunities study for the Center using the Federal Renewable Energy Screening Assistant (FRESA) software. The study identified nearly \$2 million in potentially cost-effective renewable energy projects including wind generation, daylighting, and lighting controls, and other technologies.

NREL assisted the Kennedy Space Center in determining the feasibility of a solar thermal pre-heating system that will reduce electricity consumption at a photographic film storage facility that must maintain low humidity conditions. The system will use 640 square feet of solar collectors to pre-heat the reactivation air stream for the facility's desiccant dehumidification equipment. The \$85,000 project will be jointly funded by the DOE Million Solar Roofs Program, NASA, and the Florida Solar Energy Center.

Ames Research Center plans to install a small wind-driven water pump in a remote area of the Center as part of a Super-ESPC delivery order planned for award in FY 2000. The system is expected to pay for itself in two years.

Johnson Space Center is currently working with DOE/FEMP to develop a follow-on Super-ESPC delivery order to install a solar water heating system for the astronaut training pool at the Sonny Carter Training Facility.

Marshall Space Flight Center plans to install a solar ventilation preheat system at the Building 4760 Surface Treatment Facility. Due to the large tempered make-up air requirement of the building, this \$100,000 project will save \$14,000 annually in steam heating costs.

Showcase Facilities

The Marshall Space Flight Center Project Engineering Facility, Building 4203, was designated as a NASA showcase facility. The facility features many state of the art energy efficiency environmental quality measures such as tinted windows, a variable air volume HVAC system, non-CFC chillers, an automated energy management system with direct digital controls, self-illuminating exit signs, and a radon venting system. The building is heated with steam from the Army's Redstone Arsenal steam distribution system, which is connected to the City of Huntsville's solid waste-to-steam plant.

Personnel Development

In FY 1999 NASA energy managers attended numerous energy training courses offered by DOE/FEMP, the

Department of Defense, professional associations, trade organizations, and educational institutions. The DOE's regional Super ESPC Delivery Order Workshops were particularly well attended by NASA energy personnel. The majority of NASA energy managers also attended a NASA-sponsored working meeting held in April 1999 in Cleveland, Ohio. The purpose of the meeting was to discuss ESPC contracting, the requirements of the proposed Executive Order on Greening the Government through Efficient Energy Management, and the new energy reporting capabilities of the NASA Environmental Tracking System (NETS). NETS is an agency-wide database application that supports the collection, aggregation, analysis, and reporting of environmental information required for agency-level reporting to other Federal agencies and organizations, agency-wide metrics, and functional management.

NASA is in the process of developing an energy and water conservation training course for Center energy managers and facility professionals. The course will be a four-day program offered through NASA's Academy of Program and Project Leadership.

NASA Headquarters and Center personnel also participated in various energy awareness activities throughout the fiscal year. These activities centered around the DOE/FEMP You Have the Power programs, Earth Day observances, and community outreach programs, including alternative community and transit programs.

The Kennedy Space Center Base Operations Contractor established the Energy Achievement Goals for Life and Environment awards program. The award recognizes employee contributions to energy and water efficiency and environmental improvement. During FY 1999, an award was given to an employee for reducing unneeded hot water heating. This employee's actions will reduce electricity use by more than 200,000 kilowatts per year and save \$9,400 in annual energy costs.

Funding

NASA-funded facilities energy conservation projects are divided into two categories. The first consists of minor capital improvement projects (under \$500,000) that can be achieved with Center funds. The second consists of major capital improvement projects (over \$500,000) requiring Construction of Facilities (CoF) program funding. Energy conservation projects must compete with all other construction projects for CoF funding. Life-cycle costing is the primary tool for analyzing energy retrofit projects.

It is not possible to accurately break out the cost of energy efficiency and water conservation measures

from the overall budgeted amount for CoF discrete, repair, and rehabilitation and modification projects. The following estimate of FY 1999 and FY 2000 direct agency expenditures for energy efficiency and water conservation improvement projects and audits is based on data reported by the Centers and Component Facilities:

	FY 1999	FY 2000
Direct Agency Expenditures	\$18,509K	\$20,162K

Energy Savings Performance Contracts (ESPCs)

In FY 1999, NASA made major strides in implementing ESPC contracts. NASA's first Energy Savings Performance Contract (ESPC) delivery orders were awarded at three different Centers, including the largest delivery order awarded to date through a DOE Regional Super ESPC. Up to nine additional ESPC delivery orders are planned for FY 2000.

Ames Research Center, Mountain View, CA, has received a delivery order proposal for projects that will reduce energy consumption and related operations and maintenance costs at the Center. The work involves the installation of energy-efficient lighting systems in buildings, variable speed drives on chilled water and hot water pumps, and an automated building energy management and control system. Annual savings of \$380,000 are anticipated, and final negotiations are currently in progress. The delivery order is scheduled for award through the DOE Western Region Super ESPC contract in early FY 2000.

Goddard Space Flight Center, Greenbelt, MD, established its own multiple award indefinite delivery/indefinite quantity (IDIQ) ESPC contracts with two Washington, DC-area small, disadvantaged energy service companies. Both IDIQ contract vehicles were awarded in May 1998. Each has a maximum value of \$5 million. These contract vehicles will provide for the installation of energy-efficient equipment in various buildings at Goddard Space Flight Center and Wallops Flight Facility, Wallops Island, VA, including replacement of light fixtures, installation of motion sensors, LED exit signs, and other energy savings technologies. The first delivery order for lighting upgrades in Building 8 was issued in early FY 1999. A second delivery order for lighting upgrades in Building 28 was issued in late FY 1999. Together, these two projects will save \$50,000 per year in energy costs.

Johnson Space Center, Houston, TX, awarded the largest delivery order to date under a DOE Super ESPC contract. The comprehensive delivery order involves work in five different areas at the Center with a total capital investment of over \$20 million. The work includes installation of energy-efficient lighting

systems, variable speed drives on chilled water and hot water pumps, synchronous belt motor drives, low-flow aerators on restroom fixtures, low-flow flush valves on urinals and water closets, and an automated building energy management and control system. It is estimated that the project will save more than \$2 million annually, and was featured in the June 1999 TeleFEMP VII satellite broadcast.

Kennedy Space Center, Florida, is working with DOE to award a minimum purchase project under the DOE Southeast Region Super ESPC contract. The project will provide energy-efficient lighting and HVAC system modifications for eight buildings. Annual energy savings of \$368,000 are anticipated. Kennedy Space Center is also working with the Air Force 45th Space Wing to include NASA buildings in the scope of a new Air Force ESPC project planned for the Cape Canaveral Air Station. The project will reduce energy consumption and bring natural gas to Cape Canaveral Air Station via a pipeline extension from Kennedy Space Center under the Banana River.

Glenn Research Center at Lewis Field awarded a minimum purchase delivery order to Duke Solutions, Inc., under the DOE Midwest Region Super ESPC contract. The work involves lighting system upgrades and lighting controls for 15 buildings and installation of a boiler economizer and lower drum steam heating coil in Building 12. The project will save \$240,000 annually.

Utility Partnerships

NASA Centers received no utility rebates or other incentives in FY 1999. However, several NASA Centers and component facilities continued to receive utility cost credits by voluntarily shedding electrical loads or operating standby generation capacity when requested by their local utility companies. Centers have also received large reductions in energy costs through negotiations with utility suppliers or by taking advantage of cost savings programs.

For example, Ames Research is saving \$400,000 annually on electrical demand charges associated with wind tunnel operations by joining Pacific Gas and Electric's Real Time Pricing program. Michoud Assembly Facility, New Orleans, LA, negotiated a lower electrical rate with its local utility company and the state utility regulators. The new rate will save NASA \$240,000 annually in energy and demand charges. Stennis Space Center, MS, initiated discussions with its local utility company to install power factor correction capacitors through a utility energy efficiency service contract. Annual savings of \$192,000 are anticipated.

In addition, Kennedy Space Center issued a delivery order to Florida Power and Light (FPL) to finance and construct the upgrade of the LC-39 Emergency Generator Plant. Construction was completed in FY 1999 and the plant is now being used for emergency backup and peak shaving under FPL's Commercial/Industrial Load Control (CILC) program. The \$6.83 million project will be repaid over a period of 15 years using electricity service rate savings, which is projected at \$770,000 annually.

Procurement of Energy-Efficient Products

NASA Centers and component facilities are actively procuring energy efficient goods and products that are the most life cycle cost-effective. In FY 1999, NASA Centers and Component Facilities continued to install high efficiency electrical products such as variable frequency drive systems for fans and replacements for incandescent bulbs, light emitting diode (LED) and other low power consumption exit lights, and occupancy sensors. Procedures have also been adopted to procure ENERGY STAR® personal computers whenever possible.

Several roof-top package air conditioning units and heat pumps were replaced at Kennedy Space Center in FY 1999 with smaller and more efficient units. These measures will result in savings of \$4,000 annually. The Center also installed more than 1,300 motion sensors to control lighting systems and purchased 400 ENERGY STAR® compliant computers.

Environmental Activities

Several Centers have established fluorescent tube and PCB ballast recycling programs, or specify only low-mercury "green" fluorescent lamps as replacements since they may be disposed as non-hazardous waste.

Energy Management Contact

Mr. Richard Wickman
Environmental Management Division (JE)
National Aeronautics and Space Administration
300 E Street, SW
Washington, DC 20546-0001
Phone: 202-358-1113
Fax: 202-358-2861

17. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

Energy Efficiency Performance and Implementation Strategies

The National Archives and Records Administration (NARA) owns and operates 13 separate facilities dedicated to the preservation, storage, display, and use of historical documents and artifacts. Because stringent storage requirements are very energy-intensive and preclude major changes in operational parameters to conserve energy, all of the NARA facilities are excluded from the energy reduction requirements of the National Energy Conservation Policy Act (NECPA).

NARA's yearly energy usage figures from FY 1999 show a continued reduction in energy use and are a reflection of the implementation of NARA's Energy Plan. Examples of measures taken to reduce the energy consumption during this time period are:

- Participation in electrical companies' load curtailment programs;
- Load-shedding policies at individual facilities;
- Lamp and ballast replacement projects;
- LED exit light retrofit projects;
- Installation of a cooling tower with VFDs to control the fan motors;
- Modification of AHU ATC sequences so that the discharge temperature is reset based on the return air temperature;
- Operational modifications made to reduce energy consumption;
- Installation of lighting controls;
- Replacement of existing equipment with new high-efficiency equipment.
- Operation of the emergency generator at specific times to reduce the electrical peak demand rate charge; and
- Modification of the AHU discharge air temperature set point based on heating/cooling seasons.

NARA's policy is to continue to maximize the operational efficiency of its buildings and minimize energy consumption. Items that are being planned for FY 2000 are:

- Continued implementation of energy conservation policies;
- Replacement of chillers at one of NARA's library facilities;
- Implementation of an ESPC at one of NARA's library facilities;
- Replacement of lighting systems with efficient lamps and ballasts; and
- Continuing a joint energy purchasing agreement at one of NARA's library facilities with other Federal agencies in the area.

In addition, energy and water surveys are continuing to be done in conjunction with NARA's building assessments and evaluations.

Showcase Facilities

NARA is currently reviewing its facilities to determine if any qualify to be showcase facilities.

Personnel Development

NARA has an overall incentive award program that includes an award for exceptional performance in energy conservation.

Energy Savings Performance Contracts

An energy audit and the negotiation of an ESPC was recently completed at one of the NARA facilities. The work has begun and will result in an energy savings of \$34,057 annually.

Procurement of Energy Efficient Products

NARA's agency wide policy is to purchase and specify energy efficient equipment whenever it is feasible and cost economical.

Energy Management Contact

Mr. Gary Simmons
General Engineer, Facilities Management Branch
National Archives and Records Administration
8601 Adelphi Road
College Park, MD 20740-6001
Phone: 301-713-6470 x251

18. NUCLEAR REGULATORY COMMISSION (NRC)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Nuclear Regulatory Commission's (NRC) One White Flint North (OWFN) building reported a 3 percent decrease in energy consumption compared to FY 1989, the first full year the building was occupied. Two White Flint North reported a 2 percent increase in consumption compared to its 1995 base year.

NRC Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	86.0	1,959.0
Natural Gas	1.0	8.0
Total	87.0	1,967.0

The energy management strategies implemented for both the OWFN Building and the Two White Flint North (TWFN) building in FY 1999 are:

- Utilization of an automated energy management system to maximize energy efficiency of HVAC equipment;
- Implementation of an employee awareness program that includes turning off lights when not in use;
- Utilization of occupancy sensors to control interior lighting;
- Utilization of HVAC free cooling using heat exchanger technology;
- Reduced chiller operations;
- Energy-efficient design technologies in construction and space renovations;
- Quality Assurance inspections and Quality Control to identify wasteful and/or good operating practices;
- Enhanced water treatment and filtering to improve energy-efficient equipment operations;
- Utilization of water management and conservation technology; and
- Implementation of commercial facilities management contract requirements to conserve energy by prudent equipment operating procedures

and maintenance.

Showcase Facilities

Security restrictions limit public access to OWFN and TWFN, thereby reducing their availability as showcase facilities. However, upon completion of noteworthy energy reduction projects, NRC will request that DOE publish a case survey in its FEMP Focus newsletter.

Personnel Development

NRC is an active participant in the Interagency Energy Management Task Force. Members have attended seminars, workshops, and conferences sponsored by the Task Force.

Appropriate personnel have been trained and instructed to procure ENERGY STAR® and other energy efficient equipment. The building operating contractor has received training in the goals of the energy conservation program and specific guidance on meeting these goals.

Implementation of energy conservation projects are included as elements in the position descriptions and performance plans of NRC facility managers.

Energy Savings Performance Contracts

Initiatives are underway to meet the requirements of Executive Order 13123 with regard to using Energy Savings Performance Contracts (ESPCs). A technical support team has been designated to expedite and encourage the use of these contracts as a financing mechanism to accomplish energy reduction projects.

NRC's strategy is to use the DOE Mid-Atlantic Super ESPC. Meetings have been held with DOE officials to discuss program requirements. The Interagency Agreement and Memorandum of Understanding will be signed during the first quarter of FY 2000. A comprehensive energy audit and life-cycle cost analysis of OWFN will be completed in the second quarter of FY 2000 by the DOE contractor. The audit will identify potential energy reduction projects and determine the payback period of the projects. If the DOE contractor identifies economically feasible projects, NRC will enter into an ESPC with DOE.

NRC will establish a contract for a separate comprehensive energy audit for TWFN that will establish recommendations similar to those anticipated under the ESPC program for OWFN.

Procurement of Energy Efficient Products

NRC has acquired desktop computers and monitors that are ENERGY STAR® certified. NRC will continue to use

the ENERGY STAR® certification as a selection criteria for other energy-using products. Additionally, the specifications for OWFN and TWFN building operation and management services require the contractor to operate and maintain the facilities in accordance with the National Energy Conservation Policy Act and Federal Supply Product Standards.

NRC also has an ongoing program to purchase goods and products containing recycled materials, and to recycle aluminum cans, paper, cardboard, glass bottles, and laser toner cartridges.

Utility Partnerships

During FY 1999, TWFN building participated in the Potomac Electric Power Company's (PEPCO) voluntary load curtailment program.

Workforce Transportation

NRC has implemented several initiatives to reduce gasoline consumption including:

- A video conferencing program which reduces the number of employees traveling;
- A transportation program which promotes the use of car and van pools and provides priority parking at the NRC site to employees who use them;
- A subsidy program for employees who use public transit;
- Bicycle racks and shower facilities are provided for employees who commute by bicycle;
- A partnership agreement with a local transportation organization provides free transportation home when an employee who commutes by car or van pool or public transit has an emergency; and
- Use of other incentives such as flextime and compressed work schedules to reduce employee trips.

These strategies have enabled NRC to reduce daily vehicle trips by 227 to the NRC Headquarters site.

Energy Management Contact

Mr. Ken McDow
Division of Facilities and Security
Office of Administration
Nuclear Regulatory Commission
Washington, DC 20555-0001
Phone: 301-415-1712

19. RAILROAD RETIREMENT BOARD (RRB)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Railroad Retirement Board reported an increase in energy consumption in buildings of 3.1 percent in Btu per gross square foot compared to FY 1986, the year it was delegated authority to operate its building by GSA.

RRB Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	19.7	493.5
Natural Gas	24.2	83.4
Total	44.0	576.9

The headquarters building in Chicago, Illinois, is the only building over which RRB has operational control. RRB operates and maintains the building under a delegation of authority agreement with the General Services Administration (GSA).

RRB updated its energy conservation plan in March 1993 to incorporate the requirements of NECPA, Executive Order 12759, and EPACT.

A facility energy audit of the headquarters building was conducted by consultants in 1994, using life cycle cost analysis. Partly as a result of this audit, RRB has invested in energy-efficient equipment and items such as T-8 lamps, electronic ballasts, compact fluorescent bulbs, light sensors, air controllers, new energy-efficient motors on all air handling units, timers on water fountains, automatic faucets in six rest rooms, new caulk on the inside of windows, and re-insulation of steam and water pipes which have helped reduce energy and water consumption. Also, RRB operating procedures have been refined further to achieve the maximum energy savings, including a significant reduction of staff hours worked on Saturday.

Personnel Development

This agency does not meet the definition of an executive department under section 101 of Title 5 and therefore is not subject to the energy management training provision of the Energy Policy Act (EPAct). However, personnel responsible for energy management will receive the additional training that is to be provided by GSA under the EPAct requirements.

Funding

RRB utilizes building operation funding for energy conservation measures. Between \$10,000 and \$20,000 per year of building operating funds are available for such measures. GSA, as the Government owner of the RRB building, has the responsibility to fund projects over \$50,000 and has future projects planned but not funded.

Energy Savings Performance Contracts

RRB has not entered into any energy saving performance contracts. The comparatively small size of potential contracts available to RRB at a \$50,000 limit because of the delegation of authority agreement with GSA is not practical for this type of procurement.

Utility Partnerships

RRB will be joining other area businesses in curtailing electricity use during the summer's peak demand periods. Upon notification, an energy action plan will be implemented—a predetermined checklist of electrical equipment and/or circuit breakers that can be switched off. These curtailment efforts are not expected to impact comfort or safety. Each agency will pay the contract price for electricity, which will be time-of-day and load-sensitive. GSA will provide assistance in purchasing the necessary meters. RRB has submitted its energy requirements to GSA for participation in this program, but was not selected. RRB will attempt to be included in a utility contract at another time.

Procurement of Energy Efficient Products

RRB has developed procedures to ensure procurement of energy-efficient products whenever cost-effective.

Environmental Benefits of Energy Management

New electric chillers installed by GSA utilize approved R-22 refrigerant. All obsolete fluorescent ballasts have been and will continue to be disposed of safely. Older CFC drinking fountains are being replaced with new energy-efficient, non-CFC refrigerant fountains.

Energy Management Contact

Mr. Henry M. Valiulis
Director of Supply and Service
U.S. Railroad Retirement Board
Room 1230
844 North Rush Street
Chicago, IL 60611
Phone: 312-751-4565
Fax: 312-751-4923

20. SOCIAL SECURITY ADMINISTRATION (SSA)

Energy Efficiency Performance and Implementation Strategies

SSA Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	639.8	11,864.0
Fuel Oil	3.5	10.4
Natural Gas	132.0	1,137.3
Purchased Steam	26.4	358.5
Total	801.8	13,370.2

SSA has aggressively pursued GSA funding to install energy efficient systems and equipment. SSA invested \$2.3 million of its own funds in energy efficient lighting conversions in FY 1998 and \$750,000 in FY 1999. These renovations should yield \$800,000 in annual energy and maintenance savings. By the year 2001, SSA will have implemented all energy and water conservation projects in its delegated buildings, not scheduled for a prospectus project.

SSA has developed building action plans for each of its federally-owned delegated buildings. These plans list feasible energy and demand savings projects. Each project listing includes the payback period, and projected energy savings.

While SSA's energy initiatives will produce significant energy consumption and cost efficiencies, substantive changes in the way SSA does business have affected the use of its facilities and related energy costs. These changes include:

- Significantly increasing automation at SSA. Prior to 1985, SSA had few personal computers or associated equipment. Now with the introduction of local area networks (LANs), systems include personal computers, scanners, printers and other peripherals as the baseline of support for all SSA's programmatic and operational activities.
- Expanding hours of operation. To achieve the world-class public service for which SSA is known and to provide a worker-friendly workplace, SSA opens its buildings for 12 hours a day, frequently extended to 14 hours a day, plus 8 to 16 hours each weekend. This level of service to the public and commitment to flexibility for its employees increases energy consumption and impacts its energy reduction efforts.
- Consolidating employees into government-owned

space. SSA has improved space utilization in many of its larger buildings. Recently, 400 SSA employees formerly housed in prime leased space in San Francisco moved to its Western Program Service Center (WNPSC) building in Richmond, California. The energy these employees consume is now a part of SSA's baseline data.

SSA has implemented projects at all of its delegated buildings to meet the required 10-year payback established in EPACT.

Each of SSA's government-owned delegated buildings has an energy action plan. These plans identify critical systems, outline the most cost effective way to operate the building and identify energy/water conservation projects. The projects are based on information provided in the comprehensive energy and water audits performed at its facilities.

SSA's strategy for meeting the goals established in the Energy Policy Act of 1992 (EPACT) and Executive Order 13123 are being carried out through a combination of energy audits, energy conservation projects and prospectus level projects throughout its delegated space. Prior to August 1986, the General Services Administration (GSA) was responsible for all SSA-occupied space. Since then, GSA has delegated to SSA the operational and maintenance responsibility for 9,380,000 gross square feet of space, part of a total of 26,807,000 gross square feet of space occupied by SSA nationwide.

In conjunction with GSA, SSA has completed or expects to complete in excess of \$67 million in renovations to its delegated buildings between Fiscal Year (FY) 1997 and FY 2000. The vast majority of these renovations are GSA-funded prospectus level projects. These projects, while not exclusively energy projects, will significantly affect its energy baseline by installing: 1) energy efficient central heating and air conditioning plants; 2) energy efficient windows and doors; 3) new central computer-based energy management systems; natural day lighting; and, 4) lighting controls.

SSA recently conducted comprehensive energy audits of its entire inventory of federally-owned delegated space. Audited facilities include:

- Northeast Program Service Center, New York, New York;
- Mid-Atlantic Program Service Center, Philadelphia, Pennsylvania;

- Wilkes-Barre Data Operations Center, Wilkes-Barre, Pennsylvania;
- Woodlawn Headquarters Complex, Woodlawn, Maryland;
- Western Program Service Center (WNSPC), Richmond, California; and,
- Great Lakes Program Service Center, Chicago, Illinois.

These audits covered 90 percent of SSA's delegated space; the remaining 10 percent is leased space.

Energy efficiency projects completed in FY 1999 include:

- Energy-efficient lighting, Operations Building, Woodlawn, Maryland;
- New Cooling Towers, Mid-Atlantic Program Service Center, Philadelphia, PA;
- Automatic Revolving Doors, Mid-Atlantic Program Service Center, Philadelphia, PA;
- Water Conserving Fixtures, Mid-Atlantic Program Service Center, Philadelphia, PA; and,
- Energy-efficient Lighting, Wilkes-Barre Data Operations Center, Wilkes-Barre, PA.

In FY 1999 comprehensive energy and water audits were completed at SSA delegated facilities, which had not been previously audited. SSA expects to implement projects identified in these comprehensive audits. SSA has budgeted for this work and may use ESPCs or area wide utility contracts for those projects for which SSA does not have sufficient funding. SSA anticipates using area-wide utility contracts in New York, Baltimore and Chicago to implement energy conservation and demand side management projects identified in comprehensive audits performed by local utility companies.

SSA has audited all of its government-owned delegated space as indicated above. From the six comprehensive energy audits conducted in FY 1999 SSA has initiated five projects. SSA is completing a feasibility study for a comprehensive heating and cooling plant upgrade at its building in New York. SSA does not have sufficient funds to accomplish this work, but has established a team to implement a performance contract through an existing area-wide utility contract.

A major water conservation project was completed at its WNSPC, in Richmond, California in December 1999 to use water from an underground stream for:

- irrigation;
- gray water for flushing water closets; and,
- make up water for cooling towers.

SSA has taken several steps to reduce its need for petroleum products. At the Security West leased facility in Baltimore, Maryland, SSA has converted the existing boiler from oil to natural gas. At the NCC, SSA installed a new chiller and boilers that operate on dual fuels (natural gas and oil) to allow for flexibility in the operation of the plant and use of the lowest cost fuel.

In cooperation with GSA, SSA has purchased competitive power as utility markets are deregulated. SSA now purchases competitive power for its delegated buildings in Pennsylvania. In FY 1999 SSA saved approximately \$120,000 in electric utility expenses.

SSA operates its facilities according to the energy conservation guidelines established in the Federal Property Management Regulations (FPMR) in the Code of Federal Regulations, including the latest revisions for space temperatures. SSA trains its mechanical staff and requires contractors to train their staffs to operate and maintain energy efficient equipment and systems installed in its buildings and to enhance the efficient use of new technologies.

GSA's area-wide utility contracts include all its delegated buildings and SSA is designated as an ordering official on these contracts. SSA has used them to perform energy audits and energy conservation lighting projects.

Solar and Other Renewable Energy

SSA has analyzed a variety of solar and renewable energy technologies for its headquarters buildings, but their costs keep them from being viable options. Solar lighting was installed at its NCC as a demonstration project. SSA explored installing daylighting in some of its warehouse space, but it was not economically feasible when compared with energy efficient lighting technologies. SSA is incorporating renewable technology such as natural daylighting into its prospectus level renovations.

While solar technologies (solar hot water and solar lighting) have not proven as economically viable as energy projects, SSA is evaluating the use of solar preheating for outdoor ventilation air and ground source heat pumps as renewable technologies. SSA believes that these systems can potentially be incorporated into designs of existing and new buildings.

The SSA/GSA prospectus for a new childcare facility at its headquarters in Woodlawn, Maryland, includes renewable technologies in its design. This project has been approved for construction. Renewable technologies to be incorporated into the design of showcase facility include:

- Ground source heat pumps;
- Natural day lighting; and,
- Passive solar design.

Showcase Facilities

SSA is renovating existing buildings with energy efficient technologies such as thermal storage, efficient lighting, cogeneration and passive solar technology. GSA has submitted and received approval for a prospectus project to build a new, standalone childcare facility at SSA Headquarters in Woodlawn, Maryland.

Personnel Development

Building managers and staff have attended a variety of training classes and conferences: life cycle cost (LCC) analysis, alternative fuels, lighting controls, and demand side management practices. SSA staffs attend GSA regional conferences to become familiar with current strategies in GSA's program to reduce energy consumption. In FY 1998, SSA participated in a Department of Energy (DOE) interactive training program to ensure the presence of a trained energy manager in each of its delegated facilities. SSA has scheduled additional training designed to help energy managers track energy usage and cost.

SSA's Agency Energy Management Team has been established. In addition to working on implementation of Energy Savings Performance Contracts (ESPCs), SSA has used this team as a means of educating its employees about the benefits of energy conservation and methods they can use to help conserve energy.

SSA has a designated agency energy manager who meets with DOE representatives on energy conservation issues affecting SSA. SSA has a building/facilities manager at each of its delegated facilities responsible for evaluating energy use and implementing energy conservation measures. All personnel responsible for tracking energy performance have been trained in energy conservation.

SSA has incorporated energy evaluation and analysis responsibilities into Building Management Specialist positions. SSA has ensured that facilities managers in all its facilities are aware of energy regulations and guidelines. Managers monitor energy consumption and savings.

While SSA has not established an incentive program for employees implementing EPACT and Executive Order 13123, SSA does award employees whose job descriptions require energy management skills and whose overall performance or individual acts are exceptional. SSA also recognizes individual contributions to energy savings through its on-the-spot and suggestion awards programs. In FY 1999, its Chief

Energy Manager's efforts were recognized when he received a 1999 Federal Energy and Water Management Award from the Department of Energy.

Funding

While GSA's energy conservation funds for delegated agencies have been its primary funding source, those funds are no longer available. SSA has funded many projects itself to keep energy projects moving and achieve additional savings. For example, in FY 1998 SSA awarded \$2.3 million in lighting and lighting controls projects for SSA's Headquarters Operations and Supply buildings.

Since there are no energy conservation funds available through GSA, SSA has included funding for energy conservation measures identified in the audits in its operating plan for FY 2000 and 2001. SSA is using both agency and delegations funds to accomplish energy conservation projects.

Energy Savings Performance Contracts (ESPCs)

SSA has not initiated ESPCs because many of the ideal candidate projects (primarily lighting) either have been accomplished or will be through prospectus work. To date, SSA has used direct funding for its energy conservation projects.

SSA may be able to perform some smaller projects through an ESPC, e.g., converting the remaining lighting and motors to energy efficient technologies. Other projects (variable frequency drives for pumps, elevators, and air handlers) can be accomplished through an ESPC. All projects will need to have an adequate return on investment for potential bidders to have sufficient interest in performing the work.

Procurement of Energy Efficient Products

SSA selects energy efficient and ENERGY STAR® products for installation in its buildings. The types of energy efficient equipment installed include: ENERGY STAR® office equipment (computers, monitors, copiers, and printers), and energy efficient lamps, ballasts, and electric motors. Before large capital equipment is installed, various types of equipment are analyzed, through energy audits, for the lowest life cycle cost. Examples of equipment analyzed are: pumps, air handlers, heating and cooling equipment. SSA's facility managers recognize the need to conserve energy and actively reduce energy consumption through smart management of its facilities.

Procurement of energy efficient goods has been one of the topics for action at the kick-off meeting of SSA's Agency Energy Management Team. The use of government credit cards for micro-purchases have

empowered many employees. SSA is enhancing training for employees and micro-purchasers to assure they are purchasing energy efficient products.

Phone: 410-965-4989
Fax: 410-966-0668

Environmental Benefits of Energy Management

SSA has reduced its stock of CFC equipment dramatically. SSA has a total of 12 central plants. Three central plants are located in leased facilities, and are not within SSA or GSA's purview to replace. SSA is working with GSA on the construction of new leased space for its operations in Albuquerque and possibly in Birmingham. The new space will be CFC compliant and energy efficient.

In FY 2000 SSA will convert another central plant into new ice generating CFC compliant chillers. SSA will then have seven of its nine government-owned plants converted to new equipment. In the two remaining plants SSA is moving to install new equipment.

The central plant in the Northeastern Program Service Center, delegated to SSA in FY 1997 is not CFC compliant. In this plant, SSA intends to install new equipment through a utility energy-efficiency service contract. In its plant in the Metro West facility SSA is evaluating the feasibility of connecting to a district chilled water system and removing the old chillers. SSA will continue to address the compliance issue.

It is SSA's routine practice to recycle both lamps and ballasts. SSA has incorporated this requirement into its contracts. SSA prefers to recycle polychlorinated biphenyl (PCB) containing ballasts, as it has done for three years. All existing motors, which SSA has replaced with energy efficient motors, have been recycled. This saves landfill space and better uses limited resources.

SSA will realize additional benefits as energy conservation projects are completed. The projects initiated in FY 1999, when completed, should provide annual savings of approximately 14,764,051 Kilowatt hours. The fossil fuel required to produce this amount of electricity would have discharged 14,291 pounds of carbon dioxide, 54,334 pounds of sulfur dioxide, and 43,115 pounds of nitrogen oxides into the atmosphere. These gases are known to contribute to depleting the ozone layer and creating acid rain.

Energy Management Contact

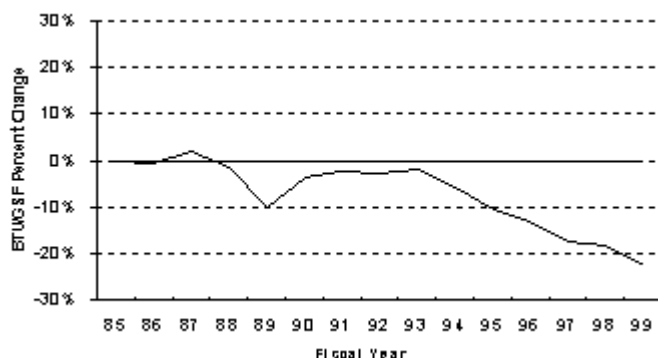
Mr. Ed Harmon
Office of Realty Management
Social Security Administration
1-B-25 Operations Building
6401 Security Boulevard
Baltimore, MD 21235

21. TENNESSEE VALLEY AUTHORITY (TVA)

Energy Efficiency Performance and Implementation Strategies

During FY 1999, the Tennessee Valley Authority reported a decrease in energy consumption in buildings of 22.8 percent in Btu per gross square foot compared to FY 1985.

TVA Performance Toward Buildings Energy Reduction Goals



TVA Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	644.0	8,493.9
Fuel Oil	2.9	20.2
Natural Gas	3.8	36.7
Total	650.8	8,550.8

TVA's Energy Plan ensures the efficient use of energy in the operation, maintenance, and design of TVA buildings and facilities. During FY 1999, TVA implemented energy conservation opportunities costing \$1.49 million with a potential annual savings of more than \$650,000. This is an average payback of 2.27 years.

To meet the challenge of surveying more buildings, the DOE Facility Energy Decision System (FEDS) building energy analysis program is used to identify and evaluate potential energy conservation opportunities (ECOs). Cost effective ECOs are identified through the FEDS software, allowing manpower to be used more effectively and efficiently for implementation of measures.

The following are energy conservation projects completed during FY 1999:

Lighting and lighting control systems were upgraded at TVA facilities under SWAP II. The concept of SWAP II is to visit a facility, perform an evaluation, consider

upgrades on the lighting controls, and install controls in applications that meet a prescribed threshold. The average payback period for upgrades during FY 1999 was less than one year.

At the Cherokee Dam Reservation, non-working street lights were replaced with low pressure sodium light fixtures.

At the Chickamauga Power Service Center, restroom exhaust fans were hooked to existing motion sensors. The cost to install the technology was \$500, while the potential annual savings is more than \$1,000.

A variable frequency drive was installed on the air handler in Monteagle Place Building. The cost of the retrofit was \$9,000 and the potential annual savings is \$400 per year for energy use with a one time maintenance savings of \$10,000.

Upgrades of electrical service, heating equipment, and roof insulation were conducted at the Norris Dam Visitor Building.

More energy efficient central air conditioning systems were installed in 12 new switchhouses this year as opposed to traditional, less efficient window units.

The Natural Resource Building had an excessively complex system to control the cooling tower and electric heaters for the water loop heat pump system. This was replaced with a simpler, more efficient system.

TVA has installed energy management systems at more than 25 other facilities.

Solar and Other Renewable Energy

To save energy and periodic maintenance costs, solar panels have been installed to power FAA warning lights at four locations.

TVA has developed a project in which it is following the development of technologies for wind turbines and for solar PV and thermal. TVA is evaluating sites within the Tennessee Valley for potential wind farm siting. The status of this project is as follows:

- The wind monitoring program has been completing and identifying potential wind sites.
- Recommendations to conduct advanced monitoring are under consideration right now.
- The solar technology following program will continue to assess technology advances and pricing trends.

- A PV installation to support green pricing will be a visible demonstration of this technology.

Showcase Facilities

The 738,500 gross square foot Knoxville Office Complex (KOC) in Knoxville, TN continues to be TVA's building showcase, as a new showcase facility was not designated for FY 1999. With over 20 energy-efficient and environmentally friendly measures implemented, building energy use in the KOC was reduced by 23 percent.

Personnel Development

TVA provides training for employees in order to accomplish objectives for the Internal Energy Management Program (IEMP). TVA provides updates on current Federal requirements and regulations for employees, managers, and TVA customers, when requested. Ongoing energy management training is provided to managers of facilities. Building energy monitors are appointed and trained for all primary corporate buildings. TVA also educates staff in both energy and environmental related topics through the TVA University.

Funding

Funding procedures for energy management and related environmental projects are reviewed through the IEMP and through the AEMC. Recommendations and comments are submitted to the proper organizations. Projects for facilities are primarily funded through renovation, operation, maintenance, and modernization efforts. Projects covered under general operations are ranked for economic benefit compared to other TVA projects to determine funding availability and implementation status, and are funded mainly through the capital budgeting process.

Energy Savings Performance Contracts (ESPCs)

TVA considers the use of Energy Savings Performance Contracts (ESPCs) when cost effective for TVA and its customers. During FY 1999, TVA did not enter into any ESPCs.

Procurement of Energy-Efficient Products

TVA's affirmative procurement policy includes a statement that energy management and efficiency will be considered along with environmental impacts when new or replacement equipment is purchased.

TVA continues its efforts to buy materials that have positive environmental qualities. In FY 1999, TVA purchased \$1.5 million of materials that met requirements of the Resource Conservation and Recovery Act (RCRA), and \$1.4 million of other recycled content materials. TVA also purchases

materials which meet sustainable architecture criteria (materials which are non-toxic, have recycled content and whose creation, use, and disposal do not damage the environment). TVA's total environmental purchases exceeded \$6.1 million in FY 1999.

Utility Partnerships

TVA continues to support electrical demand-side management activities in lieu of building additional generation. This is achieved through good working relationships with retail power distributors and large industrial customers.

TVA partners with power distributors to provide direct load control by utilizing cycling switches on water heaters and air conditioners. These switches allow for reduction of peak demands during critical load periods.

TVA has entered into rate incentive contractual arrangements with power distributors and industrial customers to provide for interruption of industrial loads during peak demand situations.

Vehicles

As a major supplier of electricity, TVA is particularly interested in supporting the use of electric vehicles (EVs). TVA continues to incorporate EVs into its fleet operations, and continues to support power distributors and local communities with EV technology demonstrations.

TVA's alternative fueled vehicle (AFVs) fleet consists of 20 EVs, which are: one van, nine sedans, and 10 pickup trucks. In FY 1999, TVA entered into an agreement with a major auto manufacturer for five leased EVs to add to its current fleet.

Environmental Benefits of Energy Management

TVA encourages employees to use mass transit systems, vans for group travel, and car pools when available and feasible. The use of coordinated TVA and vendor delivery and pick-up routing schedules and just-in-time delivery was expanded throughout TVA. This coordinated effort avoids double handling, multiple trips to the same sites, and reduces deadheading.

During Federal Energy Awareness Month, an energy exhibit was displayed for a week at each of TVA's major corporate locations. The exhibit informed TVA employees about Federal energy requirements, the steps TVA is taking to meet those requirements, and encouraged employees to help reduce energy use. The display showed how much energy each piece of equipment in an office uses in one year and also how much energy the appliances and lighting in a typical home uses each year. This allows the employees to

realize how much they can contribute to energy savings through their wise use of equipment and appliances and by turning off energy-consuming equipment when not in use.

In May 1999, TVA established a Public Power Institute to help new ideas and technologies get into the electric industry marketplace. The Institute is located in Muscle Shoals, Alabama, and will focus on development, demonstration, and deployment of technologies in the areas of sustainable and clean energy, environmental emissions reductions, environmental end-use technologies, and improvements in energy use.

TVA has committed to offer a green power product to selected areas of the Tennessee Valley by summer of FY 2000. A group of TVA employees, power distributors, and environmental constituents has designed a product comprised of new renewable sources from solar, wind, and landfill gas. The product is intended to be offered in incremental blocks to consumers.

Energy Management Contact

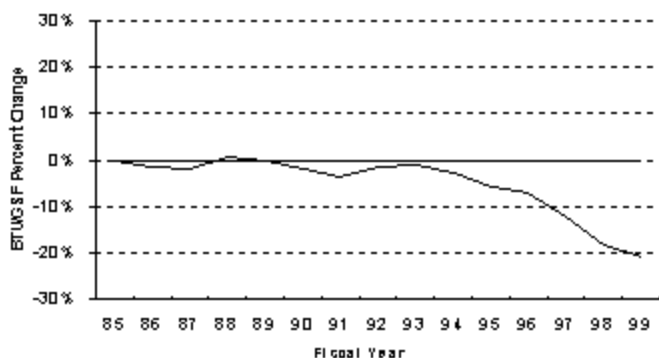
Mr. Stephen L. Brothers, Jr.
Internal Energy Management Program
Technical Services Section
Tennessee Valley Authority
Facilities and Realty Management
EE 2E-C, 1101 Market Street
Chattanooga, TN 37402-2801
Phone: 423-751-7369
Fax: 423-751-6309

22. UNITED STATES POSTAL SERVICE (USPS)

Energy Efficiency Performance and Implementation Strategies

In FY 1999, the U.S. Postal Service reported a decrease in energy consumption in buildings of 18.0 percent in Btu per gross square foot compared to FY 1985.

USPS Performance Toward Buildings Energy Reduction Goals



USPS Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	14,236.2	301,767.0
Heating Oil	821.7	3,220.0
Natural Gas	7,500.1	38,240.0
Other	569.0	4,645.0
Total	23,127.0	347,872.0

In the past, energy prioritization surveys have been completed to determine potential energy savings opportunities at more than 36,000 postal facilities nationwide. The pace of completing additional comprehensive facility audits will be determined on the basis of the USPS's ability to implement subsequent energy conservation projects. USPS plans to focus its audit priorities on processing and distribution facilities and customer service facilities that are more than 10,000 square feet in size. The main audit strategy is to conduct audits in conjunction with alternative financing projects.

USPS is committed to the goal of minimizing the use of petroleum as a fuel source. Many postal facilities have begun using natural gas in lieu of heating oil. Because of this conversion, USPS is reducing the inventory of underground storage tanks and their potential leakage problems. The consumption of heating oil is declining but the consumption of natural gas is increasing as a result.

Solar and Other Renewable Energy

USPS has entered into a partnership with DOE in supporting further development and commercial application of solar and other renewable energy sources. The Block Island Post Office of Rhode Island has installed photovoltaic demonstration project. Seven additional photovoltaic projects are planned for postal facilities in Southern California. The USPS will participate in DOE's effort by jointly developing projects and providing pilot cases where these projects and concepts could be tested.

Showcase Facilities

USPS has designated three buildings as "Showcase for Energy" facilities. These facilities are located in Portland, Oregon; St. Paul, Minnesota; and, Ft. Lauderdale, Florida. Energy audits have been completed at all three facilities and various retrofit projects are scheduled for completion. These projects include installing T-8 with electronic ballasts, upgrading central HVAC systems, and installing better energy management controls. USPS also installed pilot sulfur lamps at Portland and Ft. Lauderdale facilities.

Personnel Development

Training materials have been developed to emphasize the role and responsibility of contracting officers in complying with energy and environmental regulations.

USPS participated in the "You Have the Power" campaign, distributing more than 10,000 posters throughout 36,000 postal facilities. Seven USPS energy champions are featured among these posters.

A series of training seminars on Shared Energy Savings (SES) contracts, energy program management, and utility procurement strategies, was developed in FY 98. Newly appointed energy managers and procurement officials responsible for buying utilities and awarding energy retrofit projects attend these training classes. USPS will continue to provide additional training in energy management as the need is identified.

Funding

USPS prioritizes energy projects based on operational needs, safety and health issues, and environmental benefits, in addition to energy savings and economic analysis. The local and area office budgets or Headquarters may provide funds for implementation of energy retrofit projects.

In FY 1999, USPS Headquarters funded \$15.3 million for the purpose of improving energy efficiency; \$3.2 million for expense projects; and \$12.1 million for capital improvement projects. This ongoing energy

retrofit program identifies and implements high return on investment projects. Headquarters funds for energy retrofits are made available for projects that are prioritized based on return on investment.

USPS developed a program to replace chlorofluorocarbon (CFC) refrigerant-based chillers. USPS allocated \$22 million in FY 1998 to this program, and funding priority is based on the energy efficiency gains, age of equipment, and scheduling of companion projects. Recovered CFCs are transferred to the Department of Defense for their use in critical weapon systems where phasing out CFCs is technically and fiscally not feasible.

Energy Savings Performance Contracts (ESPCs)

USPS manages Shared Energy Savings (SES) contracts, equivalent to DOE's Energy Savings Performance Contract (ESPC) program. Since the first SES contract in 1987, USPS has made significant progress in overcoming skepticism of the SES concept. Now, USPS has 33 SES contracts in place for 1,157 facilities; the total estimated investment value is more than \$79 million and the expected total energy savings are \$7 million per year.

Procurement of Energy-Efficient Products

USPS's overall "best value" buying philosophy is a perfect fit with the procurement of energy efficient goods and products. Under this philosophy, USPS recognizes that price and price-related factors are not the only key elements in a buying decision. Other factors, such as energy consumption, energy efficiency and other life cycle costing factors relating to energy conservation should carry as much or more weight in determining contract awards. USPS developed and published the Environmental Products Guide promoting purchases of energy efficient products.

Environmental Benefits of Energy Management

In FY 1999, USPS built a post office in Fort Worth, Texas, incorporating its Green Building Design criteria. During the design process, an architect and engineering firm were required to perform an energy analysis of the design. The design analysis must demonstrate that energy efficiency meets or exceeds stringent design targets stipulated in the design criteria.

Energy Management Contact

Mr. Paul Fennewald
Environmental Programs Analyst
Environment Management Policy
United States Postal Service
Room 6830
475 L'Enfant Plaza, SW
Washington, DC 20260-2810
Phone: 202-268-6014
Fax: 202-268-6016